ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ

ΤΜΗΜΑ. ΨΗΦΙΑΚΩΝ ΣΥΣΤΗΜΑΤΩΝ
Πρόγραμμα Μεταπτυχιακών Σπουδών

«Ηλεκτρονική Μάθηση»

Ακαδημαϊκό έτος 2023-2024

ΜΕΤΑΠΤΥΧΙΑΚΗ ΔΙΠΛΩΜΑΤΙΚΗ ΕΡΓΑΣΙΑ
Της Ελένης Μυρτσιώτη (Α.Μ. MHM2348)

«Σχεδίαση και Ανάπτυξη Διαδικτυακού Μαθήματος για το Ψηφιακό Μετασχηματισμό του Σχολείου και την Καλλιέργεια των Ψηφιακών και Επιχειρηματικών Δεξιοτήτων στην Εκπαίδευση βασιζόμενοι στις αρχές των Ευρωπαϊκών Πλαισίων Ικανοτήτων DigCompEdu και EntreComp.»

"Design and Development of an Online Course for the Digital Transformation of the School and the Cultivation of Digital and Entrepreneurial Skills in Education based on the principles of the European Competency Frameworks DigCompEdu and EntreComp."

Επιβλέπων:

Δημήτριος Σάμψων

Πειραιάς, Οκτώβριος 2024

ΥΠΕΥΘΥΝΗ ΔΗΛΩΣΗ ΑΥΘΕΝΤΙΚΟΤΗΤΑΣ
ΒΕΒΑΙΩΣΗ ΕΚΠΟΝΗΣΗΣ ΔΙΠΛΩΜΑΤΙΚΗΣΕ ΡΓΑΣΙΑΣ

Αυτή η Μεταπτυχιακή Διπλωματική Εργασία υποβάλλεται ως μερική εκπλήρωση των απαιτήσεων του Προγράμματος Μεταπτυχιακών Σπουδών στην «Ηλεκτρονική Μάθηση» του Τμήματος Ψηφιακών Συστημάτων του Πανεπιστημίου Πειραιώς.

Δηλώνω υπεύθυνα ότι η συγκεκριμένη Μεταπτυχιακή Διπλωματική Εργασία έχει συγγραφεί από εμένα προσωπικά και δεν έχει υποβληθεί ούτε έχει αξιολογηθεί στο πλαίσιο κάποιου άλλου μεταπτυχιακού ή προπτυχιακού τίτλου σπουδών, στην Ελλάδα ή στο εξωτερικό.

Η εργασία αυτή έχοντας εκπονηθεί από εμένα, αντιπροσωπεύει τις προσωπικές μου απόψεις επί του θέματος. Οι πηγές στις οποίες ανέτρεξα για την εκπόνηση της συγκεκριμένης διπλωματικής αναφέρονται στο σύνολό τους, δίνοντας πλήρεις αναφορές στους συγγραφείς, συμπεριλαμβανομένων και των πηγών που ενδεχομένως χρησιμοποιήθηκαν από το Διαδίκτυο.

Παράβαση της ανωτέρω ακαδημαϊκής μου ευθύνης αποτελεί ουσιώδη λόγο για την ανάκληση του πτυχίου μου. Σε κάθε περίπτωση, αναληθούς ή ανακριβούς δηλώσεως, υπόκειμαι στις συνέπειες που προβλέπονται τις διατάξεις που προβλέπει η Ελληνική και Κοινοτική Νομοθεσία περί πνευματικής ιδιοκτησίας.

Η ΔΗΛΟΥΣΑ

Ονοματεπώνυμο: Ελένη Μυρτσιώτη

Αριθμός Μητρώου: MHM2348

Υπογραφή: 

ACKNOWLEDGEMENTS

This thesis marks the conclusion of an incredible and intense learning journey, one that would not have been possible without the support and guidance of many individuals along the way. I am deeply grateful to my thesis supervisor Prof. Dimitrios Sampson for the thought-provoking discussions during the year, for introducing me to theories and knowledge that expanded my understanding and for providing the opportunity to engage in a hands-on project such as the creation of an online course which I don't take for granted. This experience most definitely allowed me to contextualize better all the theoretical knowledge gained throughout the year. I would also like to sincerely thank all my professors and teaching staff for their support, efforts, encouragement and for introducing me to topics and knowledge I would have never considered before: Prof. Foteini Paraskeva, Prof. Simeon Retalis, Prof. Dimitrios Gkotzos, and Dr. Panagiotis Kampylis. Special thanks to Sofia Mougiakou for her assistance and comprehensive guidelines on how to navigate effectively the tools required for the creation of the online course.

I would like to cordially thank my parents, Antonios and Despoina, for their unwavering support over the years, both excellent teachers. While working at the European Centre for the Development of Vocational Training (Cedefop) I had the opportunity to familiarize myself with the research and relevant policies on micro-credentials, lifelong learning, vocational education and multi-purpose learning outcomes, therefore I would like to thank all my former colleagues for enhancing my insight into these subjects.

CONTENTS

Table of Contents

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

The present thesis explores the design and implementation of a micro-MOOC series focused on developing digital and entrepreneurial skills tailored specifically for the educational and school context, aligned with the DigCompEdu and EntreComp frameworks. The practical component involved the creation of a course on the Open edX platform, utilizing micro-learning principles to enhance participants' competencies. Six existing MOOCs were reviewed to examine the instructional design, with a focus on structure, content, and pedagogical approaches relevant to micro-MOOCs. Relevant literature on online learning, micro-learning, instructional design, assessment and skills development was also examined to identify best practices and challenges in digital education.

Creating this micro-MOOC series, involved the use of digital tools and applications, both external and in-built, which typically aim at enhancing knowledge retention and the learning process overall. These gamified features heavily drew on behaviorist principles illustrated in the relevant scientific literature used for this thesis. Digital learning and the creation of online courses for all purposes, are developing fast and this thesis aimed at highlighting that online learning as an educational innovation is not only technically complete, but also scientifically informed and solid. The courses reviewed and the scientific literature used for this thesis provided a strong foundation of examples and best practices equally relevant for educators, industry representatives and policy makers, while the course that was created specifically in the context of this thesis and the designated topic provided a great variety of activities, resources and content.

The findings of this thesis contribute to the understanding of effective upskilling strategies in digital and entrepreneurial competencies, offering insights for educators and curriculum developers. Additionally, the research done in the context of this thesis, highlights the potential of micro-MOOCs to provide targeted, accessible learning opportunities and the importance of aligning course content with established frameworks.

Keywords: micro-MOOCs, Open edX, entrepreneurship, DigCompEdu, EntreComp

ΠΕΡΙΛΗΨΗ

Η παρούσα μεταπτυχιακή εργασία διερευνά το σχεδιασμό και την υλοποίηση μιας σειράς μικρο-μαθημάτων που εστιάζουν στην ανάπτυξη ψηφιακών και επιχειρηματικών δεξιοτήτων ειδικά προσαρμοσμένων για το εκπαιδευτικό και σχολικό πλαίσιο, σύμφωνα με τα πλαίσια ικανοτήτων DigCompEdu και EntreComp. Η διαδικασία περιλαμβάνει τη δημιουργία ενός μαθήματος στην πλατφόρμα Open edX, αξιοποιώντας τις αρχές της μικρομάθησης για την ενίσχυση των ικανοτήτων των συμμετεχόντων. Έξι υπάρχοντα Μαζικά Ανοικτά Διαδικτυακά Μαθήματα εξετάστηκαν προκειμένου να αξιολογηθεί ο εκπαιδευτικός σχεδιασμός, με έμφαση στη δομή, το περιεχόμενο και τις παιδαγωγικές προσεγγίσεις που σχετίζονται με τη μικρομάθηση.

Τα τελευταία χρόνια βλέπουμε μια ραγδαία άνοδο στη χρήση τεχνολογιών στο χώρο της εκπαίδευσης που περιλαμβάνει την ανάπτυξη λογισμικού, εφαρμογών, και εργαλείων που βελτιώνουν τη μαθησιακή εμπειρία όπως οι διαδικτυακές πλατφόρμες. Τα Μαζικά Ανοικτά Διαδικτυακά Μαθήματα (ΜΑΔΜ) είναι από τις ελάχιστες περιπτώσεις τεχνολογίας που συνδυάζουν και αναδεικνύουν ταυτόχρονα όλα τα παραπάνω και επιτρέπουν σε έναν εκπαιδευτικό ή συντονιστή να δημιουργήσει περιεχόμενο βασισμένο σε συγκεκριμένα μαθησιακά αποτελέσματα για ένα στοχευμένο κοινό, έχοντας ως βάση τόσο παιδαγωγικές θεωρίες όσο και ψηφιακά εργαλεία.

Στη παρούσα μεταπτυχιακή διπλωματική εργασία εξετάζουμε αρχικά τα οφέλη και τις προκλήσεις που παρουσιάζουν τα ΜΑΔΜ σε συλλογικό επίπεδο. Πιο συγκεκριμένα, εξετάζεται κατά πόσο τα ΜΑΔΜ συμβάλουν στο να γίνει η εκπαίδευση προσβάσιμη, ευέλικτη και ποιοτική και κατά πόσο δίνεται η ευκαιρία στους συμμετέχοντες να συνεργαστούν. Σαφώς, τα ΜΑΔΜ παρουσιάζουν και κάποιες προκλήσεις όπως η έλλειψη προσωπικής αλληλεπίδρασης και καθοδήγησης με τον διδάσκων, η απροθυμία των εκπαιδευόμενων να συνεχίσουν και η διαφορά στη δομή και την αναμενόμενη ποιότητα.

Στη συνέχεια, εξετάστηκε η συμβολή των ΜΑΔΜ στη διάχυση πληροφοριών και την ανάπτυξη ψηφιακών και επιχειρηματικών δεξιοτήτων, το οποίο είναι και το κύριο θέμα της μεταπτυχιακής διπλωματικής εργασίας και της σειράς μικρο-μαθημάτων που δημιουργήθηκε. Τα Ευρωπαϊκά Πλαίσια Ικανοτήτων European Framework for the Digital

Competence of Educators (DigCompEdu) και EntreComp: The entrepreneurship competence framework (EntreComp) ενέπνευσαν σε μεγάλο βαθμό το περιεχόμενο της εργασίας και των μικρο-μαθημάτων, και τόσο η δομή τους και η κατηγοριοποίηση των επιπέδων ικανοτήτων αλλά και το περιεχόμενό τους έδωσαν τη δυνατότητα να γίνει η επιλογή των οκτώ πιο σχετικών με αυτή την εργασία μαθησιακών αποτελεσμάτων.

Τα επίπεδα B1 και Intermediate για τα πλαίσια ικανοτήτων DigCompEdu και EntreComp επιλέχθηκαν αντίστοιχα. Τα μαθησιακά αποτελέσματα που επιλέχθηκαν για τη προώθηση των ψηφιακών δεξιοτήτων αφορούσαν τη κατανόηση των χαρακτηριστικών και των ικανοτήτων που χρειάζονται οι εκπαιδευτικοί για να διδάξουν σε ψηφιακό περιβάλλον, τη χρήση των διαδραστικών πινάκων και πως συμβάλουν στη μάθηση, το σχεδιασμό δραστηριοτήτων αξιολόγησης για ψηφιακά περιβάλλοντα και τη χρήση πολλών τρόπων και μέσων (πολυτροπικότητα) για σκοπούς ανατροφοδότησης. Όσον αφορά τις επιχειρηματικές δεξιότητες, τα μαθησιακά αποτελέσματα που επιλέχθηκαν αφορούσαν τη κατανόηση και χρήση διάφορων πόρων που μπορεί να έχει ένας εκπαιδευτικός στη διάθεσή του, το σχηματισμό και ομαλή λειτουργία ομάδων ως αναπόσπαστο κομμάτι της επιχειρηματικής διαδικασίας, τη κατανόηση και σχεδιασμό μακροπρόθεσμων και βραχυπρόθεσμων στόχων και τη διάκριση και εκμετάλλευση κατάλληλων ευκαιριών που συνάδουν με τα κοινωνικοοικονομικά πλαίσια μιας εκπαιδευτικής μονάδας.

Τα συγκεκριμένα μαθησιακά αποτελέσματα που εξετάζονται με λεπτομέρεια, αλληλοσυμπληρώνονται ουσιαστικά και χτίζουν το ένα πάνω στο άλλο ώστε οι εκπαιδευόμενοι να περνάνε από το ένα στο άλλο έχοντας αποκτήσει τις κατάλληλες δεξιότητες και γνώσεις τόσο σε θεωρητικό όσο και πρακτικό επίπεδο μέσα από τις εργασίες και το αντίστοιχο περιεχόμενο. Σε αυτό το σημείο θα πρέπει να τονιστεί ότι γίνεται αναφορά στα οφέλη της μικρο-μάθησης και αυτό το μοντέλο ανάπτυξης διαδικτυακών μαθημάτων διευκόλυνε σημαντικά τη δημιουργία των μαθημάτων καθώς και το συνδυασμό δεξιοτήτων και μαθησιακών αποτελεσμάτων.

Μέσω της μικρο-μάθησης, δίνεται η ευκαιρία να εξεταστούν σε σύντομο χρονικό διάστημα όλες οι επιλεγμένες θεματικές ενότητες εξασφαλίζοντας πρωτίστως τη συνεχόμενη και απερίσπαστη προσοχή και συμμετοχή των εκπαιδευόμενων. Σε αυτό το

πλαίσιο, τόσο η έκταση του περιεχομένου όσο και οι δραστηριότητες που επιλέχθηκαν σχεδιάστηκαν με τέτοιο τρόπο ώστε η επίτευξή τους να είναι πιθανή σε μικρό χρονικό διάστημα και μέσω πρακτικής εφαρμογής, χρήση παραδειγμάτων και οπτικοακουστικού υλικού.

Ένας από τους στόχους της παρούσας μεταπτυχιακής διπλωματικής εργασίας είναι να αποτελέσει έναν οδηγό τόσο για εκπαιδευτικούς όσο και επαγγελματίες στο χώρο του εκπαιδευτικού σχεδιασμού, και υπάρχουν αναλυτικές οδηγίες και αναφορές σχετικά με τη μέθοδο, τη δομή και τα εργαλεία που χρησιμοποιήθηκαν. Όλα τα μαθησιακά αποτελέσματα είχαν ως στόχο πέρα από ένα συγκεκριμένο θέμα να δώσουν το έναυσμα στους εκπαιδευόμενους να πειραματιστούν και να δημιουργήσουν δικό τους πρωτότυπο υλικό. Οι εκπαιδευτικοί είναι ανάμεσα στους πιο ικανούς και πολυμήχανους δημιουργούς περιεχομένου και αυτή η σειρά μικρο-μαθημάτων αποσκοπεί στο να δώσει ένα παράδειγμα για το πως μπορούν να ασχοληθούν πιο ενεργά τόσο με τη δημιουργία δικού τους υλικού αλλά και με τη προώθηση καίριων δεξιοτήτων.

Συνολικά, εξετάστηκε η σχετική βιβλιογραφία σχετικά με τη διαδικτυακή μάθηση, τη μικρομάθηση, τον εκπαιδευτικό σχεδιασμό, την αξιολόγηση και τα πλαίσια ανάπτυξης δεξιοτήτων για τον εντοπισμό βέλτιστων πρακτικών και προκλήσεων στην ψηφιακή εκπαίδευση. Ιδιαίτερη έμφαση δόθηκε στο σχεδιασμό των δραστηριοτήτων αξιολόγησης οι οποίες είχαν ως βάση πολλές παιδαγωγικές θεωρίες και μεθοδολογίες δίχως όμως να γίνεται λεπτομερής ή εκτενής αναφορά αυτών στο περιεχόμενο του μαθήματος. Τα ΜΑΔΜ βασίζονται στην αυτονομία των εκπαιδευομένων και τη δική τους πρωτοβουλία για έρευνα και επιμόρφωση, συνολικά λοιπόν μπορούμε να πούμε πως πέραν από τα οκτώ μαθησιακά αποτελέσματα, οι εκπαιδευόμενοι απέκτησαν γνώσεις και εξασκήθηκαν και σε θέματα παιδαγωγικής, κάτι που πολλά προγράμματα σπουδών που απευθύνονται σε εκπαιδευτικούς απαιτούν εξίσου.

Τα ευρήματα συμβάλλουν στην κατανόηση των αποτελεσματικών στρατηγικών αναβάθμισης των ψηφιακών και επιχειρηματικών ικανοτήτων, προσφέροντας ιδέες για εκπαιδευτικούς και σχεδιαστές προγραμμάτων σπουδών, ενώ στο τελευταίο κεφάλαιο συνοψίζονται τα συμπεράσματα και δίνονται κάποιες προτάσεις σχετικά με το πως μπορεί να βελτιωθεί το παρόν μάθημα αλλά και τα ΜΑΔΜ συνολικότερα μέσω

ανερχόμενων τεχνολογιών. Τέλος, η έρευνα υπογραμμίζει τις δυνατότητες των μικρο-MOOCs να παρέχουν στοχευμένες, προσβάσιμες ευκαιρίες μάθησης και τη σημασία της ευθυγράμμισης του περιεχομένου των μαθημάτων με τα καθιερωμένα πλαίσια.

Λέξεις Κλειδιά: Μαζικά Ανοικτά Διαδικτυακά Μαθήματα, Open edX, επιχειρηματικότητα, DigCompEdu, EntreComp

CHAPTER 1: INTRODUCTION AND OBJECTIVE OF THE THESIS

1.1 Main objectives

One of the main objectives of the current thesis is to explore effective strategies and practices for designing and developing a Massive Open Online Course (MOOC) and the assessment of this process. The process involves the analysis of key elements such as instructional design principles, content creation and delivery methods, the use of assessment tools and applications, and the technology platform that hosted the course. Another objective is the thorough review of MOOCs on the same topics, meaning the development of digital and entrepreneurial skills for the school's digital transformation. Lastly, the thesis aims to assess the course and identify challenges and solutions in creating a pedagogically sound MOOC that engages learners and integrates technology.

1.2 Digital and entrepreneurial skills: the need to develop these skills as educators

The course developed in the context of this thesis, focused on the development of digital and entrepreneurial skills to achieve school upskilling, and the target group were primarily teachers but also school staff. It is crucial for educators to pursue the acquisition of these skills for two reasons. Firstly, it instills in them commitment for lifelong learning, as both digital and entrepreneurial skills are rapidly changing and developing. Secondly, through their own upskilling they can support more efficiently their students in becoming critical thinkers, take control of their learning and pursue their own ideas.

Defining the exact range of digital skills and competencies related to the use of information and communication technology by teachers is not always straightforward because unlike the digital skills used in other professions, educators need to develop skills that align, complement and enhance pedagogy, in addition to the development of educational materials and content. Teachers' digital competencies are important for contextualizing pedagogical knowledge and practice to improve students' learning (Ramírez-Montoya et al., 2017). In that respect, official guides and frameworks like the European Framework for the Digital Competence of Educators (European Commission: Joint Research Centre, et al., 2017) have indeed assisted in defining, classifying and categorizing the skills making it easier to break down the process in order to organize the acquisition of such skills which is

rapidly becoming a demand in teacher education programmes as they are seen as the innovation driving force for teaching (Ramírez-Montoya et al., 2017).

Entrepreneurship is not included as an individual subject at schools and with the exception of targeted postgraduate studies degrees, it is not an individual discipline at Universities and undergraduate programs either. This means that despite entrepreneurship being the main force behind innovation and economic growth, it is considered a compilation of skills and competencies that were only recently defined in the Entrepreneurship Competence Framework (EntreComp). Studies indicate that there is no method or process that will ensure the development of successful entrepreneurs (Bae et al., 2014) and that entrepreneurship education in particular is very diverse in terms of pedagogy, objectives, and program offerings (Fayolle, Gailly, & Lassas-Clerc, 2006) which is especially true in the European Union. Studies and relevant literature suggest that entrepreneurial characteristics can be developed with STEM education as it favors hands-on projects, traditionally an important part in STEM curriculum (Jin et al., 2015). For this reason, entrepreneurship in education is being interpreted in various ways. There are countries for example, that openly experiment with the development of E-STEM programs incorporating entrepreneurship into existing STEM courses only (Eltanahy et al., 2020), while students' inadequacy to perform well in the entrepreneurial market upon leaving school is linked with teachers' lack of experience and the overall lack of practice-oriented pedagogical approaches (Janowski & Szczepańska, 2024).

For all the aforementioned reasons, this project focused on digital and entrepreneurial skills that have the potential to transform schools, stepping on the very important work done by educators and policy makers that produced the DigCompEdu and EntreComp frameworks. Especially when it comes to entrepreneurship, the focus towards including it in the context of STEM courses alone is erroneous as students can be taught and exercise this type of skills in the context of most subjects; besides even economics isn't typically considered a STEM course. Moreover, digital and entrepreneurship skills frequently overlap and mutually complement each other; instead of developing individual MOOCs or micro-MOOC series dedicated to either one of them, and since the frameworks have indicated the various levels of competence, they can be indeed combined with their focus

on the level of competence and not the exact topic, resulting in more well-rounded and inclusive online training courses.

1.3 Professional skills development with MOOCs: advantages, challenges and evidence

Massive Open Online Courses are a solid educational practice that continuously gains popularity, offering unlimited and unprecedented access to quality education for learners worldwide. MOOCs typically provide the flexibility to learn at one's pace and given the abundance of courses and MOOC providers, they enable learners to explore diverse subjects tailored to their own learning needs or career goals.

Nowadays, companies opt to enroll their staff in courses exploring specific skills, while official, public institutions such as Ministries of Education coordinate courses to be attended en masse by teachers and educators. Massive Open Online Courses have several advantages overall, and especially skill-specific advantages as they are developed by subject matter experts or reputable Universities, ensuring their high quality.

Massive Open Online Courses also support continuous education and lifelong learning and due to their format, they can be updated to reflect latest additions or developments in a scientific domain. Several MOOC providers opt for a course re-run combining the use of old and new content, and Open edX in particular foresees and offers this option for course coordinators. Some MOOCs, depending on the provider and the subject, include projects that facilitate or even require portfolio building. Learners have their opportunity to showcase their skills right after the end of their course and this is especially important in a workplace environment that favors portfolio-based hiring more and more (Holtzman et al., 2022). This can be an inclusive practice and is not relevant for IT professionals or programmers who are typically required to build a portfolio regardless.

Apart from the acquisition of topic-specific skills, MOOCs help learners enhance their digital competencies through the use of various features integrated in the courses, as well as their collaboration, communication and teamwork skills as they often involve group projects. These skills may be perceived as 'soft skills' but they are highly relevant in the workplace too. Many platforms offer credentials such as certificates or digital badges making it easier

to highlight specific skills that have real-world relevance and focus on a specific domain or industry; very often these micro-credentials are more useful especially for evaluation purposes as they can be applied instantly in the workplace (Thi Ngoc Ha et al., 2021).

To use an example from the course developed in the context of this thesis, a badge certifying that an educator is competent in using an interactive whiteboard and its specific applications and functions, is undisputedly more useful than a generic certificate of completion of a course about the use of computers earned ten years earlier. This is because interactive whiteboards are planned to be part of every classroom in the country soon and therefore their use is a relevant, sought-after skill. A skill that can be highlighted easier in the context of a micro-MOOCs series and a single dedicated micro-MOOC, compared to a MOOC exclusively about whiteboards which would be niche and harder to develop.

Typical challenges that might be observed is that due to the large number of course attendees, learners don't always have direct access to their instructors which might be considered crucial for academically weaker learners (Hew & Cheung, 2014). Another challenge might be the seemingly superficial learning; however, MOOCs are not meant to be complete, full guides but rather introduce participants to a specific topic, engage them with relevant content and practical drills and then encourage self-study.

Depending on the context, the country and the area of specialization or skill, the lack of official recognition might be discouraging for MOOC participants who wish to showcase credentials and certificates to an employer. An interesting loop MOOC participants fall into is skill saturation especially in some areas, and digital skills is a good example of this. While several teachers attend consistently MOOCs about skills, and do receive badges and other credentials in theory, in reality they possess basic skills that cannot be used for content creation.

The course developed, focused on core and tangible skills that educators should have. In the area of digital skills we focused on the use of interactive whiteboards, the creation of e-portfolios of materials, assessment with the use of digital tools and multimedia enhanced feedback. For the part dedicated to entrepreneurship, the focus was the mobilization and use of resources and network, the planning and management of processes and spotting

opportunities for action. Additionally, the fulfillment of the collaborative tasks, the assessments and the achievement of learning outcomes by participants were perceived as 'brain rewiring' activities as they forced learners to use and apply skills met in entrepreneurship such as creativity, collaboration, exploring digital tools and achieving new goals presenting this way the content and the process equally (Al-Atabi & DeBoer, 2014).

The development of a MOOC greatly facilitated the exploration of these skills as it allowed to select and focus on useful skills for educators that can improve personal and school practices and the same time introduce learners and educators equally to interesting topics and the use of EdTech and online tools. Massive Open Online Courses for Educators (MOOC-EDs) are emerging and provide a new way to train and teach teachers to use educational technology (Tang, 2021).

1.4 The use of micro-learning model

At this point we would need to make a distinction between MOOCs, which typically last several weeks to a few months, and micro-MOOCs which are usually shorter and can be completed within hours or a few days. A series of four micro-MOOCs was designed for this project and the reason it was preferred over a MOOC with multiple modules, was the flexibility it provided as an option to develop learning materials for very specific skills and knowledge areas (specific digital competencies and entrepreneurship competencies that can be combined and taught in the same series).

Micro-learning is "*an action-oriented, technology-enhanced learning format that can accommodate multiple formats of content such as image, audio and video delivering relevant information for one specific learning outcome*" (Sankaranarayanan et al., 2023, p. 260) and as an instructional strategy it supports skill acquisition through practical activities and targeted information. One can argue that the abundance of content we consume daily for whatever purpose has affected the way we process information in general as well as our attention span, this is a reality that educators face daily. Micro-learning can indeed assist learners acquire the skills they need fast, as it reduces the cognitive load of working memory (Rof et al., 2024) and fully supported this thesis and the course developed.

1.5 Purpose and contribution of this thesis in the e-learning field

The present thesis aims at highlighting the real-world impact MOOCs have, in addition to outlining the best practices used in instructional design. It also aims at highlighting the relevance of the two frameworks used for this thesis are points of reference, encouraging more educators to review and use them, and hopefully inspiring more e-learning creators to use them for their projects. When it comes to the online course created in the context of this thesis, it is hoped that it will make the particular skills more accessible through the examples provided, filling some gaps especially in the part that concerns entrepreneurship education. Lastly, it is hoped that the online course will be a tangible example for policy makers on how their work can be used to produce instructional materials and how this practice can contribute to their dissemination.

CHAPTER 2: COMPARATIVE ANALYSIS OF COURSES ABOUT DIGITAL AND ENTREPRENEURIAL SKILLS FOR EDUCATORS

Several courses about digital skills and entrepreneurship were reviewed during the preparation of the present thesis as well as the design of the course *Next-Gen Educators: Cultivating Digital Skills and Entrepreneurship for School Transformation*. The aim of this review was to examine and compare them based on instructional design principles.

Researchers argue that evaluating a MOOC is not a straightforward procedure. Apart from the differences in their structure and duration (e.g., xMOOCs compared to cMOOCs, micro-MOOCs, or nano-MOOCs), emphasis is also placed on collaboration and connectivity (for cMOOCs) or if they follow a more institutionalized and structured approach which is the case for all courses produced by Universities or major e-learning providers (xMOOCs), and how the recent overlap between the two affect their delivery (Stracke, 2021). A total of six courses were reviewed, and below we include a brief evaluation for each one where the focus points were the learning objectives, the use of learner-centered design, instructional strategies and features used, assessment, technology integration, collaboration, structure and organization.

2.1 Massive Open Online Courses about digital competencies

2.2.1 HyperMOOC: Enhance your digital competencies and modernize your teaching

This online course focuses on teachers' digital competencies and especially the ways they can enhance their remote or blended teaching with the use of HyperDocs. HyperDocs are digital lesson plans that support multimodality and the use of hyperlinks and other resources within the same, complete document to facilitate learners. The course also introduces learners to DigCompEdu, emphasizing not only on digital skills but why and which should educators acquire. This is important because it is very rare to encounter an online course that target both specific competencies while linking them with official guidelines, policy documents or frameworks. In that respect, one learning outcome could have been the introduction of learners to important policies by the European Union and the relevant link with citizenship in the EU.

When it comes to the architecture of the course, the creators opted to use a dedicated HTML page instead of a platform typically used for online courses like Moodle, and it is the

case that this choice supports the philosophy of the course better. Enrolled participants can easily navigate the content from the side bar and the drop-down menu on the left page of the screen, while participants can easily see their progress from the relevant progress bar tool. Content-wise the course is excellent and includes all the necessary elements of instructional design: the learning outcomes are targeted, the content developed is appropriate and can be reviewed and completed timely, while it also contains relevant assessments that invoke memory without stressing out the participants. When it comes to the structure of the learning units, it is divided in three parts: explore, explain (parts A and B) and apply. Through these steps, learners are gradually introduced to the thematic of each unit. Each unit has a comments section where participants can interact.

The conceptualization of the course's layout and design is truly impeccable and supports the idea of teaching and learning with technology and multimedia very nicely; apart from providing the relevant content the course itself resembles an online document with buttons and interactive features. It also supports very accurately the theory that HyperDocs "*are attractive to many educators and [have] reportedly inspired shifts in the design and delivery of learning experiences*" (Carpenter et al., 2020, p. 2). It is very exciting to consider what this course could become next, in a follow-up or a re-run for current and/or new participants.

The multimedia and features used allow for gamification, use of escape rooms and the simultaneous exploration of several resources. The specific course was included in this review mainly due to its focus on digital skills for teachers, the use of the DigCompEdu framework and then because it encourages the exploration of multimedia in teaching and assessment, in addition to demonstrating how new content can be produced, through its demonstration units and especially Unit 2: Designing a HyperDoc. Brief information about the course can be found in Table 1 below.

Table 1: Information about the online course "HyperMOOC: Enhance your digital competencies and modernize your teaching"

COURSE DESCRIPTION	
Course title	HyperMOOC: Enhance your digital competencies and modernize your teaching.

COURSE DESCRIPTION	
Short description	The MOOC aims to present a teaching model that promotes learning through the combination of the use of educational content with digital tools and innovative pedagogical approaches.
Target learners	Active Primary and Secondary teachers, Special Education teachers, candidate teachers (students) of pedagogic departments or departments related to education, school principals and educational policy makers, anyone interested in improving their digital skills and modernizing their teaching.
Learning outcomes	Teach effectively in live, distance or blended learning environments; learn how to create a flexible and inclusive learning environment that takes into account from the outset the needs of all students, including those with disabilities or special educational needs; learn how to combine learning content with innovative digital tools and artificial intelligence applications, while staying true to effective pedagogical methods; help your students practice their 4C skills (collaboration, communication, critical thinking, creativity).
Course category/type	MOOC
Course delivery platform	HTML-based webpage provided by the University of Thessaly for the purposes of this course
Course URL	https://hypermooc.gr/
Conditions for successful completion	Complete course questionnaires, study material and actively participate in each unit, answer all reflective quizzes
Type of certification offered	Certificate of attendance
Course duration	Four weeks

COURSE DESCRIPTION	
Estimated workload for course completion	8-10 hours
Language	Greek
Prerequisites	Basic technical requirements (Internet connection, working computer); interest in the topic
Educational organization	University of Thessaly
Instructor/Coordinator	Georgios Horozidis
Other relevant information	The course introduces participant to DigCompEdu framework.

2.2.2 Online education: The foundations of online teaching

This course focuses on online education and how teachers can approach and implement online teaching. Although online teaching has become a buzz word, this course and its content summarize nicely all the things educators need to register and practice before switching to online mode of teaching. It describes how synchronous and asynchronous learning can affect the design of online learning design and focuses on the ideas of learner autonomy and learner agency. Online teaching encompasses many things that extent beyond the focus on learning outcomes: it requires the choice of appropriate materials, the consideration of learners' cognitive load, the design of assignments and the facilitation of constructive discussions. Ultimately, it concerns a lot the building of an online community as this course is a useful tool for future online instructional designers.

In terms of structure, each of the five weekly Modules is split in five units: overview, lesson, practice, additional learning resources, and assessment. The unit dedicated to the lesson is typically heavier in terms of content and contains videos and readings; more than one example of the aforementioned formats is included (typically four videos, nine readings), while for the units dedicated to practice and assessment typically two ungraded quizzes, one discussion prompt and one graded assessment are included respectively. It incorporates technology seamlessly, using in-built features that allow for personal work and collaboration equally.

The length of the videos but also the time required to go through the various articles varies. This, however, doesn't disrupt the learning process due to the organized structure the platform provides. One of the first things that learners notice is that this course heavily emphasizes on the subject matter experts' contribution which certainly adds to its credibility; that was expected either way considering that it is hosted and organized by a major e-learning provider.

An in-depth look at the content demonstrated that while the questions throughout the course are seemingly simple (e.g., *What is online learning and how is it different from face-to-face learning?*) responding to them is not as straightforward if learners aren't exposed to relevant theories like the TRACK Framework, and examples from others' practice. For this reason, the team of designers have included a great variety of materials and resources, of very high quality complementing the learning outcomes that were also appropriately chosen.

The reference list with materials for further learning always includes videos that are accessible on YouTube by everyone, articles on ResearchGate, but also articles produced and published on the website of Macquarie University. The course is an example of the University's very strong brand identity. When it comes to the assessment quizzes, the integrated features of Coursera have been used and no use of external tool is being made.

This course was included in the review due to its topic being online teaching, and it would be a very strong recommendation for teachers that are starting now but also experienced educators. It is evident that apart from the contribution of subject matter experts a lot of consideration went towards the design and the inclusion of materials that had to appeal to less experienced with the topic teachers– if we consider that the course title refers to foundations of design – however, after browsing the materials, completing the tasks and the assessments it is evident that participants have acquired significant knowledge.

Table 2: Information about the online course "Online education: The foundations of online teaching"

COURSE DESCRIPTION	
Course title	Online education: The foundations of online teaching
Short description	In a world increasingly driven by technology and online learning, particularly following the pandemic, learning in flexible ways is a prerequisite. This course teaches learners how to transform and enhance traditional in-person teaching for the online space, focusing on keeping students connected and motivated throughout. As educators globally adapt to these changes, upskilling is essential. The course covers foundational concepts in online teaching, exploring how technology has transformed education and how to design effective, interactive online learning experiences. It is ideal for educators new to online teaching or those transitioning existing resources to an online format.
Target learners	Educators around the world interested in the topic
Learning outcomes	Week 1 ▪ Understand the origins of online learning. ▪ Explore how the TPACK framework can guide your use of technology, pedagogy, and subject content when designing online learning. ▪ Understand the key differences between synchronous and asynchronous learning and what they mean for online learning design. Week 2 ▪ Understand the concept of transactional distance. ▪ Understand the concepts of learner autonomy and learner agency. ▪ Know the concepts teaching presence, social presence and cognitive presence.

COURSE DESCRIPTION	
	Week 3 ▪ Understand how cognitive load can affect your learners. ▪ Know how to signpost and guide your learners through an online course. Week 4 ▪ Explore online learning community building techniques. ▪ Know how to effectively design and facilitate online discussion forum learning activities. Week 5 ▪ Explore how the case for change is shaped by trends in technology, the environment, the economy and employment. ▪ Understand the potential future implications for online instructional designers.
Course category/type	MOOC
Course delivery platform	Coursera
Course URL	https://www.coursera.org/learn/the-foundations-of-online-teaching?specialization=online-learning-design-educators
Conditions for successful completion	Completion of 5 lessons and the corresponding quizzes.
Type of certification offered	Certificate of attendance (with subscription)
Course duration	Five weeks
Estimated workload for course completion	20 hours
Language	English

COURSE DESCRIPTION	
Prerequisites	Basic technical requirements (Internet connection, working computer); interest in the topic
Educational organization	Macquarie University (Australia)
Instructor/Coordinator	Professor Iain Hay, Billy Bruce, Jada Bennett
Other relevant information	N/A

2.2.3 Instructional Design: Digital Media, New Tools and Technology

This course covers a range of topics that provide a deep dive into the principles and strategies of instructional design, including learning theories, curriculum development and the use of digital media. The specific course is divided in eight weekly modules that each is further divided in five or six units consisting of lectures, knowledge checks, activities and wrap up.

Compared to the online course we reviewed in the previous section, this course doesn't indicate the time needed to complete a unit or task. It also contains lengthy texts especially when it comes to the introduction of a topic or a methodology, or the instructions and definitions for the Activity sections despite including a video. It is evident that the team behind the design of this course has greatly considered learner facilitation due to certain features that are typically not encountered in MOOCs. Apart from the progress bar that many courses include, edX allows learners to indicate the intensity of their learning goal which partially explains why there is no suggested time allocation in the individual activities.

Learners can also use directly the highlight feature on the webpage to mark something or leave a comment for their own review later, which appears under the Notes section of the course. Open edX provides a wide variety of in-build tools and the team behind the course has made great use of them.

The learning outcomes of this course vary in terms on number in each Module ranging from two to five. They are targeted and to the point and were chosen carefully, while blending

with and complementing the learning outcomes of the previous two courses (dedicated to learning theories and instructional design models) but also the final course that comes next (dedicated to the evaluation of the participants courses, their individual capstone projects). This course is the most technical in the series and it was included in this review because the topic aligns with the digital and technical skills, we examined in the context of this thesis for educators who wish to become tech savvy content creators. Consequently, it doesn't emphasize on learning theories or pedagogy which was already done in the previous courses of the series but outlines in great detail features and multimedia used in instructional design.

The concept behind capstone course projects is very interesting; they are the courses developed by learners in various disciplines towards the end of their graduate degrees allowing them to experiment with the design but also apply all the things they learned. This was an appropriate choice considering that the course is part of a MicroMasters and can be used to obtain eventually a master's degree from the coordinating University.

Research suggests that capstone projects if organized in alignment with the program's requirements, but also in conjunction with industry and the educational institution coordinating the program, are beneficial for all parties involved (Gorka et al., 2007). Considering the specific course, supervision and feedback from an industry expert and assistance during the delivery phase would indeed assist the learners in particular but thinking in depth about this concept we understand that it might lead to incredible collaborations and new educational programs in the long term for every University that provides to students the possibility to create a course as a final project.

Table 3: Information about the online course "Instructional Design: Digital Media, New Tools and Technology"

COURSE DESCRIPTION	
Course title	Instructional Design: Digital Media, New Tools and Technology

COURSE DESCRIPTION	
Short description	This courses aims at supporting learners create digital learning objects such as images, videos, screencasts, audio, and interactives that align with the courses they outline[1].
Target learners	Educators, instructional designers
Learning outcomes	Week 1 ▪ Create an introduction using a multimedia tool. ▪ Identify different types of digital media used in instructional design. ▪ Differentiate between copyright, citation, fair use and Creative Commons. ▪ Create a digital media checklist to evaluate an OER or other digital media. ▪ Evaluate an OER using a digital media checklist. Week 2 ▪ Identify fundamental concepts, best practices, and options for creating accessible visual documents and audio files for eLearning. ▪ Create a digital text-based learning object and a 1- to 3-minute accompanying audio file description for a minicourse. ▪ Evaluate a digital text-based learning object and audio file for a minicourse using a digital media checklist. Week 3 ▪ Identify uses, best practices, and options for creating and editing images ▪ Create a digital image (with alt text) for a minicourse

[1]While these media are used in courses designed generally and therefore this type of skills are necessary for every instructional designer, this MOOC is the third in a series of four and the main objective is for learners to create media for the courses they created in the first and second courses. The principle however remains.

COURSE DESCRIPTION	
	▪ Evaluate a digital image for a minicourse using a digital media checklist Week 4 ▪ Identify uses, best practices, and options for creating and editing video ▪ Create a 2- to 4-minute accessible video published to an appropriate platform for a minicourse. ▪ Evaluate a video for a minicourse using a digital media checklist. Week 5 ▪ Identify uses, best practices, and options for creating screencasts and animation videos. ▪ Create a 2- to 4-minute accessible screencast or animation video published to an appropriate platform for a minicourse. ▪ Evaluate a screencast or animation video for a minicourse using a digital media checklist. Week 6 ▪ Identify uses, best practices, and options for creating storyboards. ▪ Create a storyboard for a lesson or unit module for a minicourse. Week 7 ▪ Identify uses, best practices, and options for creating interactive learning modules. ▪ Create and publish an accessible interactive learning module using an authoring tool for a minicourse.

COURSE DESCRIPTION	
	▪ Evaluate an interactive learning module for a minicourse using a digital media checklist. Week 8 ▪ Describe uses, best practices, and options for using artificial intelligence in e-Learning. ▪ Evaluate an Instructional Design Document (IDD) for an identified minicourse and make necessary updates.
Course category/type	MOOC
Course delivery platform	Open edX
Course URL	https://learning.edx.org/course/course-v1:USMx+LDT300x+2T2024/home
Conditions for successful completion	At least 80% success rate in the assignments (knowledge check carrying 20% of weight, weekly activities and peer reviews carrying 30% and the signature assignment carrying 50% of the weight).
Type of certification offered	Certificate of attendance (with subscription)
Course duration	Eight weeks
Estimated workload for course completion	8-10 hours
Language	English
Prerequisites	Although the course is part of a MicroMasters series no specific background or specialized knowledge is required. Basic technical requirements (Internet connection, working computer) and interest in the topic.
Educational organization	University of Maryland Global Campus
Instructor/Coordinator	Brandie Shatto (Professor and Program Director)

COURSE DESCRIPTION	
Other relevant information	This course is the third out of four courses of the UMGC Instructional Design and Technology MicroMasters program offered by the University of Maryland Global Campus. Successful completion of the MicroMasters series accounts for 12 credits that count towards the master's degree from the same University (for which a total of 30 credits are needed).

2.2 Massive Open Online Courses about entrepreneurial competencies

2.2.1 Teach like an Entrepreneur: Bringing Entrepreneurship into the Classroom

This course is hosted on FutureLearn, a leading British e-learning provider, and has received funding from the European Union and more specifically the European Institute of Technology (EIT). It is an independent body and its main goal is to foster innovation and entrepreneurship across Europe.

The course is an excellent example of synergy between academia, education providers, industry experts and policy makers, it is truly rare to combine all these stakeholders and elements in a single endeavor. Naturally, the EntreComp framework was a steady point of reference and was introduced during the third week (the course has a total duration of four weeks) and only after participants were introduced to relevant literature and practical exercises about entrepreneurship in general and entrepreneurship in education and Europe specifically.

Weekly workload consists of multiple units ranging from four to six, and each unit contains multiple materials and tasks, ranging from two to ten. While undoubtedly the team behind the course has an estimate of the time needed for the assignments and the tasks, the approximate time for each one is not mentioned publicly, the only thing for participants to consider it the closing date of the course. The platform's architecture is learner-centric and allows participants to interact with each other under every article to discuss and exchange,

to monitor their overall progress from the respective bar on the top of the page and navigate the content of the course easily from the side bar on the left side.

When it comes to the practical tasks, there is no consistency in terms of structure but every task is added within reason and for specific purposes. During all weeks, participants need to take mandatory but non-graded quizzes where often more than one correct response is required and when participants make a mistake a hint to assist them appears at the end of the page. It is an example of how formative assessment was used in the context of this MOOC that introduces learners in a rather challenging topic exposing them to very demanding materials, therefore the stress of performing well in most quizzes has been lifted.

During week three where EntreComp was introduced, participants were asked to participate in an exercise that required from them to explore their surroundings and spot opportunities for entrepreneurship around them. The point of this task aligned well with the demanding resources learners had to study during the previous weeks and required critical thinking, which is also the case for the quizzes, no memorization was necessary.

FutureLearn usually requires from learners to engage with at least 90% of the materials and respond successfully to 75% of the questions in the final exam. The team behind the course opted to use ungraded assignments during the course and make eligible for the certificate participants who drafted a lesson plan and participated in the peer-review evaluation process of other lesson plans. An evaluation rubric was also provided. The course was selected for this review as it aligns with the topic of this thesis and uses principles and ideas from the EntreComp framework that this thesis was based on.

Table 4: Information about the online course "Teach like an Entrepreneur: Bringing Entrepreneurship into the Classroom"

COURSE DESCRIPTION	
Course title	Teach like an Entrepreneur: Bringing Entrepreneurship into the Classroom
Short description	The course aims to distinguish various forms of entrepreneurship, highlight the importance of entrepreneurial

COURSE DESCRIPTION	
	skills for both individuals and society, and connect these concepts with STEM education and subjects. It also aims to integrate entrepreneurship into the teaching of participants using hands-on learning methods, and real-world, challenge-based resources, and to understand how entrepreneurship learning can create empowering learning environments that give students the opportunity to bring their ideas into action. Participants are also introduced to EntreComp: The Entrepreneurship Competence Framework.
Target learners	This course is tailored for educators aiming to revolutionize their teaching methods and inspire entrepreneurship in young minds. Though primarily focused on secondary school teachers in STEM subjects (science, technology, engineering, and mathematics), it can also appeal to professionals from other fields who want to foster entrepreneurial thinking in their students.
Learning outcomes	▪ Examine and distinguish between different forms of entrepreneurship. ▪ Evaluate the significance of entrepreneurial skills for individuals and society, connecting these skills with STEM-specific education. ▪ Discuss the impact of cultural values on entrepreneurship and identify ways to overcome the fear of failure. ▪ Select and apply challenge-based resources and work-based learning methods to effectively nurture entrepreneurial skills in the classroom. ▪ Develop courses that incorporate business-oriented activities to promote entrepreneurial thinking.
Course category/type	MOOC
Course delivery platform	FutureLearn

COURSE DESCRIPTION	
Course URL	https://www.futurelearn.com/courses/teach-like-an-entrepreneur-bringing-entrepreneurship-into-the-classroom/1
Conditions for successful completion	Successful participation in the lesson planning activity and the peer review during week four.
Type of certification offered	Certificate of Achievement (available with FutureLearn subscription).
Course duration	Four weeks
Estimated workload for course completion	Four hours per week
Language	English
Prerequisites	Basic technical requirements (Internet connection, working computer) and interest in the topic.
Educational organization	The course was funded and coordinated by EIT (European Institute of Innovation and Technology) which is an example of collaboration between industry and education providers.
Instructor/Coordinator	Professor Dana Redford
Other relevant information	Apart from FutureLearn the certificate is accredited also by The CPD Certification Service.

2.2.2 Teaching Entrepreneurship

This course is hosted on EU Academy, the official online platform of the European Union for courses and training materials. It launched in 2023 and is the biggest Moodle project in the world with multiple teams working on its infrastructure. Despite the fact that the visual identity of the platform complies with the requirements of the European Commission, the essential features are all from Moodle. All the units and assessments are integrated in the platform and use Moodle features while all the videos are uploaded on YouTube. Typically the courses hosted on EU Academy are produced and supervised by experts and the institutions directly, and this applies in this course as well.

The specific course is one of the outcomes of the entreTime project[2] and the main focus points are to introduce entrepreneurship to students as a way of doing things but also introduce them to EntreComp. Content-wise is an extremely elaborate and well-structured course, very rich in materials and resources. It is a learner-centric and therefore student-paced course that remains open for everyone and does not put the pressure of time on participants, which is why there is no indication of deadlines and closing dates.

The course consists of seven Modules and has additionally three sections dedicated to welcoming the participants, the introduction and the section dedicated to instructions on how to receive the certificate. The content is outlined in the same landing page and each section expands and further contains an image, the description of the Module, a list of videos that range from five to ten, ready to download documents with information about the course and the respective quiz. The content and various Modules can be navigated easily, as this course is supported by Moodle.

All the materials that were selected for this course are of very high quality, examine a wide variety of topics in great detail and is evident that their production was a lengthy process in which students, teachers, University professors and policy makers were involved. We would need to highlight that apart from the participating experts that were invited to contribute, the Strascheg Center for Entrepreneurship in Munich was also part of this endeavor as a member of the consortium, consequently it is yet another example of collaboration between educators, experts and policy makers.

The learning outcomes presented are comprehensive and address key aspects of entrepreneurship education. They cover a wide range of topics, including the theoretical foundations of entrepreneurship (EntreComp, Mindset Theory), practical skills (opportunity recognition, innovation, design thinking), and ethical considerations (sustainability, impact innovation).

The outcomes are useful as they provide a framework for developing a well-rounded entrepreneurship curriculum. By understanding the theoretical concepts, students can

[2] https://eismea.ec.europa.eu/news/entretime-project-training-teaching-entrepreneurship-eu-academy-2023-02-21_en

gain a deeper appreciation for the entrepreneurial mindset and its application in various contexts. The practical skills outcomes, equip students with the tools to identify opportunities, develop innovative solutions, and effectively communicate their ideas. The ethical considerations outcomes encourage students to think critically about the social and environmental impact of their entrepreneurial endeavors.

Since entrepreneurship requires transversal skills and a lot of work on behalf of teachers who have no experience on the topic, the existence of so many learning outcomes would be possible only for an open course without pressing deadlines. Another alternative would be to use the competence levels presented in EntreComp (European Commission: Joint Research Centre et al., 2016) designing activities for various competence levels introducing the same topics, or a combination of topics that becomes gradually more challenging. There is no forum or comments area for participants to discuss.

Table 5: Information about the online course "Content of the course Teaching Entrepreneurship"

COURSE DESCRIPTION	
Course title	Teaching Entrepreneurship
Short description	The main objective of this course is to provide a solid source of information to learners without a background in entrepreneurship, disseminate the EntreComp framework, and teach them what an entrepreneurial mind-set is. Learners are also introduced to a framework that helps them address challenges and make decisions. Participants are familiarized with systems thinking and its implications and are presented with the need for continuous innovation. The course also provides a background on responsible entrepreneurship and presents coaching as a way of aligning students to be able to achieve optimal results. The course is self-paced and open to everyone curious in learning more about how to integrate entrepreneurship and innovation into their classroom. It helps with educators'

COURSE DESCRIPTION	
	professional and personal development, by acquiring practical life skills. They also learn to understand the value of entrepreneurial competencies and most importantly, they help establish an entrepreneurial spirit among students.
Target learners	Educators in higher education from all disciplines who are interested in learning how to teach through entrepreneurship and foster entrepreneurial mindsets in their students.
Learning outcomes	• Provide background on entrepreneurship and EntreComp • Learn what the entrepreneurial mindset is • Introduce learners to a framework that helps to address challenges and make decisions • Introduce systems thinking and its implications • Present the need for continuous innovation and use of co-creation as a tool for innovation • Provide a background on responsible entrepreneurship • Present coaching as a way of aligning students to be able to achieve optimal result
Course category/type	MOOC
Course delivery platform	EU Academy (hosted on Moodle)
Course URL	https://academy.europa.eu/courses/teaching-entrepreneurship/view/
Conditions for successful completion	Successful participation in seven quizzes
Type of certification offered	Certificate of completion
Course duration	Self-paced, indicated as one day to browse the materials; careful attendance is estimated to need seven days

COURSE DESCRIPTION	
Estimated workload for course completion	Approximately two hours daily
Language	English
Prerequisites	Basic technical requirements (Internet connection, working computer) and interest in the topic.
Educational organization	European Commission and the Strascheg Center for Entrepreneurship in Munich.
Instructor/Coordinator	The course was coordinated by experts in DG GROW, DG EAC, ETF, JRC and EISMEA.
Other relevant information	The course is an outcome of the public funded project entreTime. Promoting the EntreComp framework was a major objective of this initiative (project, course).

2.2.3 E-Desk: Digital and Entrepreneurial Teachers for a Fast-Changing World

This online course focuses on teachers' digital skills and understanding of entrepreneurship. It was included in this review as we also examine the acquisition of digital and entrepreneurial skills for school upskilling. The MOOC was created in the context of e-DESK – Digital and Entrepreneurial Skills for European Teachers[3], a project funded by the European Union.

The course was hosted on Moodle and more specifically the learning management system coordinated by the University of Zagreb. All the features were nicely integrated in a well-managed and learner-centered platform and did not use additional technologies or applications with the exception of embedded videos from YouTube and the final section of the course where articles and studies for each of the learning outcomes were listed and incorporated in a digital repository of resources. The structure of each Module indicates that it is consistent in terms of items and units however it slightly differs in content with different practical elements included as needed: case studies, drafting lesson plans, practice and peer assessment.

[3] https://edeskeurope.eu/

Structure-wise, the content was distributed in a well-planned manner into nine core Modules, with two additional and shorted Modules for Introduction and Personal Development in which the final assessment is included. Each Module has a dedicated Forum section where participants can interact starting new threads; likewise there are assessment quizzes in every Module. The learning outcomes in this course excellently integrate pedagogy, digital skills, and entrepreneurship, equipping learners with a comprehensive toolkit for modern educational and business challenges. The practical application of these skills ensures a well-rounded and impactful learning experience.

The cohesion and focus of the various modules in this MOOC are truly commendable. Each module seamlessly builds upon the previous one, ensuring a smooth and logical progression through the subject matter. The course starts by the introduction of learners to entrepreneurship and highlights relevant competencies, requirements for the competencies and pedagogical approaches, and then moves onto digital skills acquisition, learning design, evaluation and quality assurance. It also highlights EntreComp in a different light explaining how it can be used in conjunction with sustainability. The resources are

The content stays consistently on-topic, offering clear and concise information without overwhelming the learner. The inclusion of video scripts is particularly valuable, providing an additional layer of accessibility and allowing participants to follow along with ease or review key points at their own pace. This thoughtful structure enhances the overall learning experience, making the course both engaging and highly effective.

Table 6: Information about the online course "E-Desk: Digital and Entrepreneurial Teachers for a Fast-Changing World"

COURSE DESCRIPTION	
Course title	E-Desk: Digital and Entrepreneurial Teachers for a Fast-Changing World
Short description	The course aims to help participants develop their skills in entrepreneurship education, as well as in online teaching methods and practices, and to develop their online skills by enhancing the entrepreneurial abilities of their students.

COURSE DESCRIPTION	
Target learners	Teachers and other professionals in the field of education.
Learning outcomes	▪ Be able to describe methods to enhance student engagement and entrepreneurial skills in online learning. ▪ Identify ways to assist students in being able to identify and create value in real world environments. ▪ Analyze and explain ideation in various learning environments. ▪ Understand the value of ideas and actions in different contexts. ▪ Select resources to support ethics and sustainability. ▪ Evaluate strengths and weaknesses in hybrid and digital teaching for entrepreneurial skills. ▪ Integrate MOOC materials with other resources to improve teaching practices. ▪ Be able to design subsequent teaching sessions for specific learning environments. ▪ Create learning experiences that enhance engagement and motivation using various tools and techniques. ▪ Make use of technology to support pedagogical approaches that develop entrepreneurial and problem-solving skills.
Course category/type	MOOC
Course delivery platform	Moodle
Course URL	https://learn.foi.hr/course/view.php?id=30
Conditions for successful completion	Participants must achieve 75% in the final assessment.
Type of certification offered	Certificate of completion that accounts for 2 ECTS.
Course duration	20-30 hours as indicated in the guide

COURSE DESCRIPTION	
Estimated workload for course completion	The course is self-paced and contains 9 core Modules, the average time needed to complete each one is estimated at two hours.
Language	English
Prerequisites	Basic technical requirements, prior knowledge is not required.
Educational organization	University of Zagreb
Instructor/Coordinator	Federico Gutiérrez-Solana Salcedo, Alba González Calleja, Blaženka Divjak, Barbi Svetec, Josipa Bađari, Carla Portela, Paulo Belo Costa, Pirjo Kuru
Other relevant information	The course is an outcome of the public funded project e-DESK.

In this review we examined six online courses on the topics of digital and entrepreneurial competencies. All the selected courses were of particularly high quality, aligned with the topic of this thesis and the online course developed in its context. We had the opportunity to explore courses that lead to MicroMasters qualifications, official credentials, developed by Universities and international organizations.

A general observation is that even leading e-learning providers occasionally don't clarify the distinction between requirements and target audience, while the two are entirely separate. Target group entails the people each course aims at reaching, while requirements can mean several things from technical requirements to previous experience or specific academic background.

Another argument relates to the estimated time needed to complete the courses. Corporate and professional e-learning providers define with great precision the duration and expected workload needed for a course. Courses that were the outcomes (intellectual outputs and work packages) or public funded projects were for the most part self-paced and remained open, while they were created by experts they focused heavily on dissemination in addition to practical workload. These were the only inconsistencies

observed however it is worth pointing out that every course examined and included in this review had different aims and was created in different contexts.

These courses provided a solid basis for the conceptualization and creation of the course *Next-Gen Educators: Cultivating Digital Skills and Entrepreneurship for School Transformation.* The course adds to the existing offering of courses first and foremost because it incorporates a diverse range of pedagogical methods, which was lacking to some extent from courses created by policy makers and project managers. It also introduces new tools and actively promotes content creation, providing educators with the opportunity to enhance their digital and entrepreneurial skills, enabling them this way to better meet the evolving demands of modern teaching.

CHAPTER 3: ONLINE COURSE DESIGN

3.1 Exploring the benefits of MOOCs for skills acquisition

3.1.1 Accessibility and flexibility

By definition MOOCs suggest that they facilitate access en masse, are open to everyone and can be accessed online without geographical restrictions. No matter if the main aim is to learn something new, re-skill or take a course from an institution with global reputation, MOOCs can engage learners with topics and ideas that wouldn't be possible otherwise and one can argue that this is a democratizing practice as they make education more inclusive (Shanley et al., 2020).

In terms of flexibility, MOOCs allow the use of learner-centered approaches and pedagogies, encourage collaboration and peer interaction and since they are the outcome of a technology centered approach, they decentralize knowledge by introducing learners to multiple modalities and media sources like video, podcasts, forums, and readings. Most importantly, these modalities can be taught and used simultaneously combined with multiple approaches and theories in pedagogy.

3.1.2 Effectiveness and quality

An effective MOOC should engage learners even before the learning process begins by considering the information provided during the dissemination and communication stages before the launch. There, the duration, expected outcomes, workload among others need to be clarified. It also foresees instructor quality by ensuring that the team behind the design of the course are skilled, which can have a great impact on the delivery of the course (Suresh & Srinivasan, 2020). The production and launch of a course is a lengthy process that usually requires the review and approval of several professionals including instructional designers, subject matter experts, the technical team and in most cases communication professionals. Most importantly, these are all skills that can be gained by teachers who wish to get involved with instructional design.

Quality frameworks are constantly developed to define and help measure the indicators and standards that define MOOC quality. When MOOCs started gaining popularity the wide audience was introduced to them through blog articles or the mainstream press, however,

now we have the resources and the qualified professionals to provide an insight in specialized education journals while research and dedicated programs exist in several Universities (Lowenthal et al., 2015).

3.1.3 Networking opportunities

The number of MOOCs targeting educators in primary and secondary education is increasing worldwide and it is observed that leading providers such as Coursera and edX collaborate with leading Universities, institutions and even museums to design training programs for teachers (MOOC-Eds). This paves the way for incredible opportunities in the future to design and deliver courses on topics such as financial literacy, entrepreneurship, Arts and other disciplines that are harder to cover in the traditional curriculum (Kellogg et al., 2014).

While in terms of support most MOOCs provide limited access to instructors, they provide the opportunity to learn with like-minded colleagues and form a network which as a resource is not something to be underestimated and is rapidly becoming a topic in the MOOC related literature.

3.2 Exploring the challenges of MOOCs for skills acquisition

3.2.1 High dropout rates

Despite the increasing number of programs offered, the improvement in terms of technical infrastructure, the development of tools that can be integrated to improve a MOOC and the increasing expertise in the field, research suggests that MOOCs still suffer from poor learner retention with approximately 10% of learners finalizing their course. Furthermore, this percentage seems unchanged over the past decade as it stands since 2013 (Liyanagunawardena et al., 2014; Wang et al., 2023).

High-dropout rates can mean significant financial loss for the e-learning provider especially since many platforms allow learners attend their courses for a period of time without paying fees. The reasons for dropouts can vary from lack of English proficiency, lack of personal interest, different expectations regarding the workload, poor technical infrastructure and user experience or overwhelming amount of information among others

(Eriksson et al., 2017). An interesting research outcome following in-depth interviews and relevant research with the participation of learners indicates that 'learning on demand' was also a factor with MOOCs used in a modularized way, with learners quitting the course once they have fulfilled their learning needs. This puts into perspective the usefulness of micro-learning (Wang et al., 2023).

3.2.2 Lack of personal interaction

Communication, collaboration and critical thinking are essential skills for everyone including teachers and one can argue that MOOCs don't necessarily facilitate their acquisition. There are cases where MOOCs don't include dedicated forum or comments areas, collaborative tasks or peer assessment. In addition, while the use of media and various formats is now mainstreamed, they don't always appeal to every type of learner as it is impossible to align for everyone the appropriateness from a cognitive perspective, the attitudes regarding problem-solving in virtual environments and the personal need for face-to-face interaction (Gulatee & Nilsook, 2016).

3.2.3 Quality variation

Even if an online course has high quality content it still might not reflect students' needs in a global context. Inclusion isn't measured only in terms of accessibility; a course has to be culturally relevant, provide accreditation that is recognized across countries and business sectors and ensure that the assessment process especially when it comes to peer assessment is a fair, transparent process where all learners put equal effort into (Castillo et al., 2015).

3.3 MOOCs and their role in the development of specific skills

In the previous Chapter we reviewed several courses on the topics of digital and entrepreneurial skills developed on various platforms. While the mode of delivery differed according to what each platform highlights (e.g., more emphasis on delivering content, provision of examples, multimedia used, etc.) the use of MOOCs to inform and educate about these topics was the common denominator. In the present Chapter we will elaborate on the strengths and weaknesses of this educational approach.

In the present thesis we focus on skills for teachers who wish to contribute towards their school's digital and entrepreneurial transformation. Massive Open Online Courses are examined in this context regarding their use and effectiveness, and we reflect on the advantages and challenges they present when it comes to skills acquisition. Teachers' primary role is the one of facilitator and in order to facilitate their students' digital competencies they need to be confident in their use of technology themselves.

3.3.1 MOOCs and their role in the development of digital skills

Navigating the online environment of a course that expands over several weeks improves digital agility. Participants are required to learn in a collaborative environment, access and work with a variety of materials in different formats, create and share their own materials. In addition, several online courses use open resources (OER) whether it is documents, videos, articles in addition to online applications used for assessment (e.g., quizzes). This has direct implications on participants' skill acquisition and an additional benefit in using and further disseminating after the end of a course, these materials which directly contributes to the formation of a knowledge society that drives progress (Rivera et al., 2015).

Teachers now more than ever are required to produce original content; the use of technology alone is not sufficient. Massive Open Online Courses today cover various topics in relation to digital skills acquisition like graphic design, assessment in digital environments, instructional content such as the use of communication tools or EdTech products but also ethics and digital citizenship.

The use of ICT tools was further enhanced following the pandemic outbreak and teachers around the world had to make a considerable effort to close the gap in terms of skills but also schools struggled with limited resources and lack of infrastructure. Digital skills entail much more than the use of software or hardware, it relates to communicating effectively in an online setting, make sound use of it, respect copyright, process information responsibly.

3.3.2 MOOCs and their role in the development of entrepreneurial skills

When it comes to the effectiveness of MOOCs in exploring entrepreneurship their contribution can be measured in two ways: by disseminating resources and materials about entrepreneurship and by using in the course innovative tools and applications that originate in the start-up universe (Resei et al., 2018). There are numerous MOOCs for various competence levels about business, management or marketing to name a few fields and as we saw in Chapter 2 there are several MOOCs that are relevant for the European audience, illustrating the status of entrepreneurship and entrepreneurial education as well as relevant policies and frameworks. Entrepreneurial education is essential as it consists of multiple transversal skills that are not included in the standard curriculum and the lack of knowledge does not allow opportunity identification (Sitaridis & Kitsios, 2024).

For courses that foresee webinars and other live events the interaction with an expert might be feasible, an opportunity that otherwise may not have been feasible. Many online courses feature talks, articles and even case studies by entrepreneurs so the use of real-life examples, regarding success and failure equally, give a realistic representation about what it means to be an entrepreneur and how skills are built.

On the downside we need to clarify that interacting with an industry expert or entrepreneur does not equal mentorship which could have been the case in a physical classroom. In addition, most of the skills required for entrepreneurship are practical, hands-on and require good communication skills; it is often challenging for MOOC participants to showcase in a virtual environment they possess these skills which might consequently lead to demotivation and possibly dropout.

3.4 Definition of learning outcomes

The course *Next-Gen Educators: Cultivating Digital Skills and Entrepreneurship for School Transformation* emphasized on digital and entrepreneurial skills for teachers and school staff who wish to contribute to their school's transformation. A total of eight learning outcomes were chosen based on two important frameworks, DigCompEdu and EntreComp.

It is very important to ensure that the chosen learning outcomes can be used effectively and in a cohesive way to create a MOOC that will equip learners with all the necessary skills. Learning outcomes need to be relevant, reflect the level of competence (in our course it was B1 – Intermediate) align well with the chosen activities. They also need to be supported by the assessment tasks of a course, meaning that if it is impossible to create assessments based on the chosen learning outcomes, they need to be contextualized better or redefined. From a pedagogical point of view, learning outcomes need to be supported by relevant theories and approaches.

3.4.1 Understand the characteristics and skills needed for digital teaching

This learning outcome focuses on developing a foundational understanding of digital teaching, since it is also the first one in the course. Learners should be able to name the distinct characteristics of teaching in the digital age, refer to relevant technologies, and understand how interactivity and accessibility can improve teaching and learning. When it comes to the practical aspect of this learning outcome, learners are asked to contextualize all the above and learn how to create e-portfolios of materials using digital sites hosting and disseminating content.

The reason this learning outcome was selected and listed first, was to ensure that all learners have the same starting point, especially since the aforementioned practical task was included. The message we wanted to convey is that by changing their instructional practices and by adopting digital tools and technology overall our target audience can create more engaging, interactive and pedagogically sound materials that they can further improve, build on and share.

This learning outcome was introduced in the context of Key Area 3 Teaching and Learning highlighting the need for educators to familiarize with the technologies they have to incorporate in their teaching in order to enhance learner engagement.

3.4.2 Understand why interactive whiteboards can improve the teaching and learning process, and their impact on collaborative learning

This learning outcome aimed at putting in the frame the most popular EdTech product, the interactive whiteboard (IWB) which is additionally the only tangible product mentioned in DigCompEdu. Especially in Greece, there has been consistent discussion for the past couple of years about each kindergarten and K-12 school acquiring an IWB. Consequently we can see that private EdTech companies create their own training programs, however, this doesn't ensure that these trainings are pedagogically sound.

By understanding how to effectively use IWB in their practice, teachers can create more engaging and collaborative learning environments. Interactive whiteboards can be used to download applications, create and share materials and facilitate the research done in the context of group activities. In addition, they allow for in-school capacity building trainings with teachers sharing information capitalizing the resources and knowledge found among their colleagues, as well as the exchange of best practices. This learning outcome was selected in the context of Key Area 3 Teaching and Learning in DigCompEdu and more precisely relates to collaborative learning.

3.4.3 Design and implement effective assessment strategies for digital learning environments

The ability to create reliable assessments as a teacher is extremely important. Informed assessments demonstrate that teachers are able to collect valid data on students' performance, demonstrating their understanding of the curriculum first and foremost in addition to their students' individual learning progress.

The creation of great assessments, both formative and summative, apart from the self-explained check on students' knowledge gives the opportunity to teachers to demonstrate their own skills and effectiveness of instruction. This learning outcome does not focus on students at all; it aims at introducing teachers with limited experience of using digital tools, in how to create online quizzes, rubrics, export and collect data with the use of tools and applications.

It requires effort on behalf of learners to familiarize themselves with digital assessment and especially adapt it to the needs of formative and summative assessment. Regardless, is a core competence highlighted in DigCompEdu, and is very relevant for school improvement overall.

Key Area 4 about Assessment is one of the most important components in DigCompEdu and this learning outcome explores assessment strategies that can be implemented in online environments and with the use of digital tools.

3.4.4 Give feedback using digital tools and multimodality engaging my students in the process

This learning outcome was selected because feedback is an essential component of learning and provides students with information about their efforts and performance. We are accustomed to associating or mixing feedback with the final grades in a semester for example, however, if implemented correctly and in an engaging way feedback can push students to continue learning, aim at improving their performance and boost their confidence. But the criteria for 'good feedback' extend beyond knowing our learners personally or proving feedback timely.

They way we try to create inclusive learning environments that appeal to as many learner types as possible, schools need to focus on providing feedback respectively. By examining this learning outcome, we aim at demonstrating how to incorporate multimedia and various formats such as audio, image, text in our feedback. Multimodal feedback is engaging, enhances equally students' and teachers' digital competencies, and involves students in the process. Ultimately, through this learning outcome we want to demonstrate how this important component in education can improve standard school practices.

This learning outcome was defined in a way to examine multimodality in feedback empowering teachers become more confident in using tools and create their content equally, and was introduced in the context of Key Area 4 about Assessment and more specifically feedback and planning.

3.4.5 Evaluate and utilize different resources at their disposal to maximize their impact

Teachers think about and use various resources daily. With this learning outcome we aim at facilitating teachers reflect on the use of existing tangible and non-tangible resources at their disposal in relation to entrepreneurial activities and projects. Are there thought-provoking materials or a FabLab at school to use with students while asking them to produce something? How can teachers use the existing resources in their STEM class to prepare their students for a competition?

Resourceful teachers are not only those who objectively excel in their subject, but also those who can create meaningful and effective learning experiences for their students to broaden their perspective. A school that can foster critical thinking and problem-solving skills is an innovative school and this extends to learners and staff equally.

This learning outcome was included in order to showcase that apart from textbooks any resource can be used in class while assisting students materialize their plans and ideas even if there is a lack of a dedicated workspace or hardware. It is also meant to encourage teachers draft lesson plans that incorporate activities that align with EntreComp and was selected to reflect Key Area 2 about Resources.

3.4.6 Form and coordinate a team ensuring that everyone to work collaboratively towards a common entrepreneurship project

This learning outcome was included in the course to highlight the importance of communication and allow learners reflect and create on this topic. While communication was examined in the context of digital skills, it truly is of paramount importance. EntreComp introduces this competence in the context of involving and persuading others get involved in an entrepreneurship project. For the needs of this course, we examine communication in a holistic way that includes discussing different perspectives, conflict resolution, pitching an idea, role distribution, forming partnerships and a network of mentors. These are some of the toughest things to do in the entrepreneurial context and all relate to communication.

This learning outcome is focused on teachers (the target group) like the rest of them; it aims at facilitating learners understand how communication and collaboration can result to a productive learning environment and foster innovation at school level. It was selected in the context of Key Area 2 about Resources and more specifically non-tangible resources meaning the mobilization of others and the formation of a team.

3.4.7 Design activities that serve short term and long-term goals creating action plans

Teachers are undisputedly among the best planners. Teachers who are skilled at planning and organizing can create structured learning environments, helping students achieve their learning goals. With this learning outcome we examine how students can be introduced, through entrepreneurship, to long-term and short-term planning. This might concern for example, the acquisition of skills to succeed professionally, which requires significant planning, or better time management which is more imminent.

Through this learning outcome, teachers learn how to contextualize decision making and the creation of action plans, assist their students in adopting an entrepreneurial mindset oriented towards real-world problems, understand concepts of career readiness and financial literacy and learn how to engage short-term and long-term in networking. Planning is not only defined by task division; it is an important skill in entrepreneurship and equally relevant for learners but also schools as a whole. This learning outcome reflects Key Area 3 Into Action and more specifically the relevant skills about planning and management.

3.4.8 Spot opportunities to design appropriate activities that reason with social and economic needs

While the ability to spot opportunities is definitely a critical if not the most critical skill for entrepreneurs, the way subjects are taught today completely diminish every chance teachers have to illustrate it. For example, even in humanities and the subject of History if students were taught in a way to showcase what opportunity arose after a significant event it would still be more relevant compared to the sterile way they are taught today because it would force them to reflect critically. Opportunity recognition and value creation cannot fit in the context of a specific subject; they are one of the transversal skills

that students need to develop strategic thinking and the mindset to isolate a problem and see how they can solve it.

This learning outcome reflects Key Area 1 Ideas and Opportunities and was chosen because the societal needs we face today provide unlimited possibilities to create and produce solutions as long as the appropriate skills and mindset are instilled in students. Through this learning outcomes, learners have the opportunity to discover how they can reflect critically, identify opportunities and attempt to create solutions that benefit themselves, their team or their community.

3.5 Rationale for the use of Micro-Learning

3.5.1 Relevance of Micro-Learning

Micro-learning, as opposed to courses with longer duration, is associated with work-based learning as it focused on specific skills, taught through the delivery of brief learning units (Leong & Sung, 2021). This is primarily because it has been associated with onboarding or learning and development training programs in corporate settings. However, micro-learning programs and series of MOOCs are now addressed to teachers and learners in a broader sense.

Micro-courses are designed in such a way to utilize learners' perception, memory, vision and thinking while avoiding cognitive load and supporting efficiency (Lv et al., 2020).
This practice aligns with strategies used in social media today as well, and ensures that learners are trained to distinguish, process and use the information presented at them while retaining their attention (Cz., 2016).

3.5.2 Micro-Learning in the context of this micro-MOOC series

The course *Next-Gen Educators: Cultivating Digital Skills and Entrepreneurship for School Transformation* was created in alignment with two frameworks, DigCompEdu and EntreComp. Both frameworks have classified skills and competencies through their standardized levels which provide a clear structure for becoming aware, assessing, comparing and studying these skills.

When it comes to the overall structure of each Unit, micro-learning put a limit to their number and duration and allowed us to focus on specific learning outcomes and competencies, as both digital and entrepreneurship encompass equally an extensive range of skills, abilities, and knowledge. Therefore, micro-learning allowed us to isolate the competencies we required and had chosen for this course, allowing a logical sequence between the micro-MOOCs we designed and splitting the course into two parts, one for each area.

We saw in an earlier Chapter that one of the reasons learners drop out of MOOCs is the achievement of a specific learning outcome. This implies that learners often give up once they navigate a small part of the course, so by using this strategy while considering the chosen competence level (B1 – Intermediate) we included micro-MOOCs and the respective activities that promoted the two frameworks, and introduced learners to various tasks maintaining their interest as all learning units were relevant for their level but also content-wise.

Micro-learning could not have been used in a different way – presuming for example that we chose to focus only on one area (e.g., digital skills) and one topic (e.g., lesson planning with digital tools) across all levels of competence. This wouldn't be feasible because it would imply first and foremost that no certification could be provided. It is however a great approach to use when a variety of skills need to be combined even if they are cross-disciplinary to deliver one course series and we do see that Universities are using it to design programs that can be considered and count towards a master's degree.

Lastly, micro-learning had an impact on the assessments used in these micro-MOOCs which were frequent, provided instant feedback, and were created on mobile-friendly tools.

3.6 Designing the micro-MOOCs

3.6.1 Structure

The micro-MOOC series consists of an introduction module, four core micro-MOOCs and a final micro-MOOC dedicated to the final assessment and the wrap-up. The introductory

micro-MOOC is where basic technical information and the expectations of the course were outlined, in addition to the learning outcomes. The four core micro-MOOCs examine two learning outcomes each and have identical structure including units dedicated to Presentation, Demonstration, Practice, and Self-evaluation tasks including the open-response assessment, discussion forums and additional resources. With the exception of the open response assessment that was allocated 30', all the remaining units and tasks were allocated 15' maximum.

According to Lackner et al., (2014) there are certain categories to consider while creating a structure for a MOOC and they are based on ADDIE model, the "*most commonly used instructional design framework focused on core requirements, structure, participant requirements, assignments, media design, development, communication and resources*" (Höfler et al., 2017, p. 51). All these factors have been carefully considered as reflected in the details in the next sections and the next Chapter.

In every Demonstration unit apart from its respective assessment which we will talk about next, we have added a non-mandatory but recommended task that prompts participants to experiment with new tools and technologies to produce materials for their own portfolio, which eventually we explain in the end that was an indirect objective of the course. Research has shown that learner engagement after a point drops drastically and eventually leads to drop out. Indicative, when it comes to learners engagement with various MOOC features, only 10% of forum activities relate to posting or starting a new thread (with 90% just passively viewing) while 48% of video activity consists of participants only clicking on Play without pausing, taking notes online or engaging with the subtitles (Sinha et al., 2014).

These hands-on tasks are meant to be fulfilled in learners' own time and trigger their interest about each unit. In the next sections we will present in detail elements of the micro-MOOC series; the full the educational design table can be found at the end of the Chapter in Table 7 (originally created by Sofia Mougiakou).

3.6.2 Learning activities

The learning activities chosen for the micro-MOOC series were included in the Presentation and Demonstration sections of each micro-MOOC and contained various formats. Presentations with relevant content were prepared originally for the purposes of each micro-MOOC and their respective learning outcomes, with every micro-MOOC illustrating two learning outcomes. The graphic design platform Canva was used for and was embedded on Open edX for every presentation; the choice was deliberate for the target group, as Canva started out as a tool for communication professionals but it now offered to schools with tailored subscription plans.

Research and literature review took place to produce them, while pedagogy and examples of practical implementation were used as needed. In addition, video presentations were used in each micro-MOOC; a total of ten videos were included and six were created by the author for the purposes of these micro-MOOCs specifically. Various graphs originally created by the author were used to highlight the content of each unit.

3.6.3 Assessment and feedback features

Multiple assessments were included in the micro-MOOCs. In every initial unit an introductory poll was included, and the tool used was Google Forms. In the Demonstration units various evaluations using diverse tools were used. When it comes to external tools, Quizlet was chosen because it allowed for consistency however it can be used in various modes such as flashcards, match and answer games and multiple choice.

The integrated on Open edX assessment features used were Drop Down Problem with Hints and Feedback, a Problem with Adaptive Hint, Image Mapped Input and eventually Multiple Choice without feedback or assistance for the final evaluation. The Dropdown Problem with Hints and Feedback was used a lot in the series and each time it was drafted based on a pedagogical method or theory (e.g., Constructivism, Behaviorism, Problem Based Learning etc.). This way, the understanding of the content and the respective theory was examined simultaneously.

Lastly, the Poll feature was used for the self-evaluation in the form of a checklist that was added in the wrap-up sections of the micro-MOOCs. Open edX has been steadily improving its features especially when it comes to assessment and the addition of various question types with the possibility to give hints or feedback facilitates micro-learning in particular, especially when a course is self-paced, asynchronous and remains open meaning that learners won't necessarily have the opportunity to engage in discussion in a forum area.

3.6.4 Technology integration

In addition to the applications used that were mentioned in the previous section, both integrated and external features were used where customization in their code was required. The discussion forum function was used heavily throughout the course. In addition, discussion boards like Padlet and collaborative whiteboard platforms like Miro and Preceden were used to complement mainly the Practice units on the micro-MOOCs, adapting their width, length and font size as needed. Word clouds were added in every wrap-up unit and the tool preferred was Quizizz. Lastly, a custom-made progress bar and badges was used adapting the HTML code found on the open-source websites W3Schools and Get Bootstrap.

3.7 Observations and future possibilities

Designing this course and writing this thesis allowed for an in-depth literature review on topics such as e-learning, instructional design, pedagogies, open-source and micro-learning in addition to pedagogy. One of the main conclusions was that not only it is truly a transversal skill but it can be used effectively to educate and inform the public regardless of profession; most people are either unaware or don't have the right incentive to join an online course or the right course for them.

The objective of the course we created was to facilitate teachers who wish to contribute to their school's transformation, however, digital and entrepreneurial competencies concern everyone and with some exceptions (e.g., formative and summative assessment or feedback) this course could have been useful for citizens too. We take the opportunity to reflect on a South Korean initiative where the government collaborated with a large group of Universities and launched a nation-wide MOOC academy (Jung & Lee, 2018). It

was promoted it in such a way to bear the distinct characteristics of the country's culture (the K-MOOC learning system paraphrasing K-pop, a phenomenon that put the country in the global culture, tourism and music map).

This example alone by such a technologically advanced country that typically excels in education competitions across subjects indicates the belief in online learning, adult and lifelong learning, and MOOCs encompass them all. It is also a truly striking example about the impact online courses can have in areas that extend beyond learning such as citizenship, parental guidance, citizen science and participatory learning by engaging the population into one massive community.

Table 7 Full educational design of the micro-MOOC series[4]

Activity ID [ACT_ID]	Description of Educational Activity	Digital Technologies and Features Used	Indicative Duration of Educational Activity	Link to Learning Outcomes
Day 1:Registration and Introduction to the micro-MOOC (60')				
1.1	**About this course (21')**			
1.1.1	**[Presentation]Welcome** Welcome video [1.46] https://youtu.be/iZ_KironnXk A brief video where the MOOC structure is presented to participants.	Hypertext, video	3'	-
1.1.2	**[Presentation]Introduction, competence level and aim** Page presenting basic information and the objectives of the course.	Miro interactive graph, Hypertext	5'	-
1.1.3	**[Presentation]Learning outcomes of the MOOC** Page presenting all the learning outcomes of the course.	Hypertext	3'	-
1.1.4	**[Presentation] Micro-MOOC structure** Page presenting the Micro-MOOCs of the course and the components of each part.	Image, Hypertext	3'	
1.1.5	**[Presentation] Micro-MOOC license** Page presenting the Creative Commons license of the course.	Hypertext, Image	2'	

[4] The present table was initially provided in the context of the course 721 – Educational Technology by staff member Sofia Mougiakou during her demonstration sessions. It has been adapted (translation from Greek to English) for the purposes of this Chapter and it is shared under a Creative Commons license. We are grateful for this guide and her permission to use and include it.

Activity ID [ACT_ID]	Description of Educational Activity	Digital Technologies and Features Used	Indicative Duration of Educational Activity	Link to Learning Outcomes
1.1.6	**[Presentation] Creators and inspiration** Brief information about the author and a few words about what inspired this course.	Hypertext, Image	2’	
1.2	**Prerequisites (7’)**			
1.2.1	**[Presentation] Prior knowledge and skills** Page outlining the necessary, existing skills participants should have.	Hypertext	5’	
1.2.2	**[Presentation] Minimum technical requirements** Page where the minimum technical requirements for the attendance of this course are outlined.	Image, Hypertext	2’	
1.3	**Completing the course (12’)**			
1.3.1	**[Presentation] Necessary actions to complete the course** Page presenting the necessary actions to successfully complete the course.	Hypertext	3’	
1.3.2	**[Presentation] Open response assessment for self-assessment** Page where the Open Response Assessment (ORA) exam is explained.	Hypertext	3’	
1.3.3	**[Presentation] Forum participation** Page information about the forum.	Hypertext	2’	
1.3.4	**[Presentation] Final exam of the Micro-MOOC** Page with information about the final exam.	Image, Hypertext	2’	
1.3.5	**[Presentation] Getting your micro-MOOC certificate** Page with information on how to receive the certificate upon successful completion of the course.	Image, Hypertext	2’	

Activity ID [ACT_ID]	Description of Educational Activity	Digital Technologies and Features Used	Indicative Duration of Educational Activity	Link to Learning Outcomes
1.4	**Introduction to the topics of the micro-MOOC (20')**			
1.4.1	**[Poll]What do you know already about our topics?** Poll activity	Poll	5'	
1.4.2	**[Video]**Experts' opinion Introducing the DigCompEdu and EntreComp Frameworks [5:15] **[Problem with Adaptive Hint]**	Hypertext, video	8'	
1.4.3	**[Discussion Forum] Introduction activity** Introduction activity with the use of a Padlet board	Hypertext, Padlet	5'	
Day 2 – Micro-MOOC 1 – Digital pedagogy and classroom transformation				
2.0	**Introduction (15')**			
2.0.1	**[Presentation] Learning outcomes of the Micro-MOOC** Page presenting the learning outcomes of the first Micro-MOOC. 4 polls with questions about previous knowledge or experience	Hypertext, poll	15'	
2.1	**Unit 1 – Digital teaching: characteristics and skills (1 hour)**			
2.1.1	**[Presentation] Unit 1.1** Presentation about the characteristics and skills needed for digital teaching	Image, Hypertext, Canva presentation	15'	LO1: I can understand the characteristics and skills needed for digital teaching
2.1.2	**[Demonstration] Unit 1.1** Create Your Portfolio on Google Sites [6:02]	Hypertext, video	15'	
2.1.3	**[Practice] Unit 1.1** Practice task using the Image Mapped Input feature to exercise participants' memory.	Hypertext, Image Mapped Input, Canva, Forum	15'	

Activity ID [ACT_ID]	Description of Educational Activity	Digital Technologies and Features Used	Indicative Duration of Educational Activity	Link to Learning Outcomes
2.1.4	**[Self-evaluation] Unit 1.1** Drop-Down Problems with Hints and Feedback to evaluate participants' understanding and critical thinking.	Hypertext, Drop-down problem with Hints and Feedback	15'	
2.2	**Unit 2 – EdTech: The interactive whiteboard in your class boosting innovation, creativity and collaboration (1 hour)**			
2.2.1	**[Presentation] Unit 1.1** Interactive whiteboard use: pedagogy, communication, skills and tips	Image, Hypertext, Canva presentation	15'	LO2: I can understand why interactive whiteboards can improve the teaching and learning process, and their impact on collaborative learning
2.2.2	**[Demonstration] Unit 1.1** How to Use the Easy Interactive Tools in Whiteboard Mode [3:08] Fact of the day!	Hypertext, Video, Image	15'	
2.2.3	**[Practice] Unit 1.1** Practice test to be taken in various formats (flashcards, test, match game) Task – Create your Template	Hypertext, Quizlet, Canva	15'	
2.2.4	**[Self-evaluation] Unit 1.1** Drop-Down Problems with Hints and Feedback to evaluate participants' understanding and critical thinking.	Hypertext, Drop Down Problem with Hints and Feedback	15'	
2.3	**Unit 3 – Recap and Self-Assessment (50')**			
2.3.1	**[Presentation] Micro-MOOC 1 recap** Page summarizing what we saw in Micro-MOOC 1	Hypertext	5'	LO1 & LO2

Activity ID [ACT_ID]	Description of Educational Activity	Digital Technologies and Features Used	Indicative Duration of Educational Activity	Link to Learning Outcomes
2.3.2	**[Open Response Assessment]** Self-assessment using the Open Response Assessment feature using the relevant rubric	Open Response Assessment	30’	
2.3.3	**[Self-evaluation] Checklist: I can…** Three brief polls evaluating participants’ knowledge Word cloud feature for participants to share their impressions Progress Bar	Hypertext, Poll, Quizizz, W3schools, Get Bootstrap	5’	
2.3.4	**[Discussion Forum]** Forum discussion feature with two topics for participants to discuss	Discussion Forum	10’	
2.4	**Recommendations for further learning**			
	[Recommendations for further learning] List with resources about the topic	Hypertext, Hyperlinks		
Day 3 – Micro-MOOC 2 – Assessment and feedback for the modern school (3 hours)				
3.0	**Introduction (15’)**			
3.0.1	**[Presentation] Learning outcomes of the Micro-MOOC** Page presenting the learning outcomes of the second Micro-MOOC. 4 polls with questions about previous knowledge or experience	Hypertext, Google Forms	15’	
3.1	**Unit 1 - Formative and summative assessment with the use of technology (1 hour)**			
3.1.1	**[Presentation] Unit 2.1** Exploring Formative, Summative and Digital Assessments	Image, Hypertext, Canva presentation	15’	LO3: I can design and implement effective assessment

Activity ID [ACT_ID]	Description of Educational Activity	Digital Technologies and Features Used	Indicative Duration of Educational Activity	Link to Learning Outcomes
3.1.2	**[Demonstration] Unit 2.1** Using Google Forms and Canva for Formative and Summative Assessment [4:41]	Hypertext, video	15’	strategies for digital learning environments
3.1.3	**[Practice] Unit 2.1** Three multiple choice quizzes Task – Create your Template	Hypertext, Quizlet Canva	15’	
3.1.4	**[Self-evaluation] Unit 2.1** Drop-Down Problems with Hints and Feedback to evaluate participants’ understanding and critical thinking.	Hypertext, Drop-down problem with Hints and Feedback	15’	
3.2	**Unit 2 - Multimodality in feedback (1 hour)**			
3.2.1	**[Presentation] Unit 3.2** Multimodality in feedback	Image, Hypertext, Canva presentation	15’	LO4: I can give feedback using digital tools and multimodality engaging my students in the process
3.2.2	**[Demonstration] Unit 3.2** Using digital tools for multimodal feedback [5:00]	Hypertext, video	15’	
3.2.3	**[Practice] Unit 2.2** Match and Answer game with four questions Task – Create your Template	Hypertext, Quizlet, Preceden	15’	
3.2.4	**[Self-evaluation] Unit 2.2**	Hypertext, Drop-down problem	15’	

Activity ID [ACT_ID]	Description of Educational Activity	Digital Technologies and Features Used	Indicative Duration of Educational Activity	Link to Learning Outcomes
	Drop-Down Problems with Hints and Feedback to evaluate participants' understanding and critical thinking.	with Hints and Feedback		
3.3	Unit 3 – Recap and Self-Assessment (50')			
3.3.1	**[Presentation] Micro-MOOC 2 recap** Page summarizing what we saw in Micro-MOOC 2	Hypertext	5'	LO3 & LO4
3.3.2	**[Open Response Assessment]** Self-assessment using the Open Response Assessment feature using the relevant rubric	Open Response Assessment	30'	
3.3.3	**[Self-evaluation] Checklist: I can…** Three brief polls evaluating participants' knowledge Word cloud feature for participants to share their impressions Progress bar	Poll, Quizizz, W3schools, Get Bootstrap	5'	
3.3.4	**[Discussion Forum]** Forum discussion feature with two topics for participants to discuss	Discussion Forum	10'	
3.4	**[Recommendations for further learning]** List with resources about the topic	Hypertext, Hyperlinks		
Day 4 – Micro-MOOC 3 – Creating value through resources and people (3 hours)				
4.0	Introduction (15')			
4.0.1	**[Presentation] Learning outcomes of the Micro-MOOC** Page presenting the learning outcomes of the third Micro-MOOC. 4 polls with questions about previous knowledge or experience	Hypertext, Google Forms	15'	

Activity ID [ACT_ID]	Description of Educational Activity	Digital Technologies and Features Used	Indicative Duration of Educational Activity	Link to Learning Outcomes
4.1	**Unit 1 - Planning and mobilization of resources (1 hour)**			
4.1.1	**[Presentation] Unit 3.1** How entrepreneurship can transform schools – Using resources	Hypertext, image, Canva presentation	15’	LO5: I can evaluate and utilize different resources at my disposal to maximize their impact
4.1.2	**[Demonstration] Unit 3.1** Tina Seelig: Classroom Experiments in Entrepreneurship [6:11]	Hypertext, video	15’	
4.1.3	**[Practice] Unit 3.1** Flashcards memory game as a practice activity and interactive mind map providing additional hints Task – Create your Template	Hypertext, Coggle, Quizlet, Miro board	15’	
4.1.4	**[Self-evaluation] Unit 3.1** Drop-Down Problems with Hints and Feedback to evaluate participants’ understanding and critical thinking.	Hypertext, Drop-down problem with Hints and Feedback	15’	
4.2	**Unit 2 - Planning of teams (1 hour)**			
4.2.1	**[Presentation] Unit 3.2** How entrepreneurship can transform schools – Mobilizing others and Teamwork	Hypertext, image, Canva presentation	15’	LO6: I can form and coordinate a team ensuring that everyone works collaboratively
4.2.2	**[Demonstration] Unit 3.2**	Hypertext, video	15’	

Activity ID [ACT_ID]	Description of Educational Activity	Digital Technologies and Features Used	Indicative Duration of Educational Activity	Link to Learning Outcomes
	The Perfect Pitch in 4 Minutes – How to create one for your future investors? [3:55]			towards a common entrepreneurship project
4.2.3	**[Practice] Unit 3.2** Match and Answer quiz Task – Create your Template	Hypertext, Quizlet, Miro	15’	
4.2.4	**[Self-evaluation] Unit 3.2** Drop-Down Problems with Hints and Feedback to evaluate participants’ understanding and critical thinking.	Hypertext, Drop-down problem with Hints and Feedback	15’	
4.3	**Unit 3 –Recap and Self-Assessment (50’)**			
4.3.1	**[Presentation]** Page summarizing what we saw in Micro-MOOC 3	Hypertext	5’	LO5&LO6
4.3.2	**[Open Response Assessment]** Self-assessment using the Open Response Assessment feature using the relevant rubric	Open Response Assessment	30’	
4.3.3	**[Self-evaluation] Checklist: I can…** Three brief polls evaluating participants’ knowledge Word cloud feature for participants to share their impressions Progress bar	Poll, Word cloud, W3Schools, Get Bootstrap	5’	
4.3.4	**[Discussion Forum]**	Discussion Forum	10’	

Activity ID [ACT_ID]	Description of Educational Activity	Digital Technologies and Features Used	Indicative Duration of Educational Activity	Link to Learning Outcomes
	Forum discussion feature with two topics for participants to discuss			
4.4	**[Recommendations for further learning]** List with resources about the topic	Hypertext, Hyperlinks		
Day 5 – Micro-MOOC 4 – Enhancing school entrepreneurship through opportunity assessment and planning (3 hours)				
5.0	**Introduction (15')**			
5.0.1	**[Presentation] Learning outcomes of the Micro-MOOC** Page presenting the learning outcomes of the fourth Micro-MOOC. 4 polls with questions about previous knowledge or experience	Hypertext, poll	15'	
5.1	**Unit 1 - Action plan design for the management of short-term and long-term goals (1 hour)**			
5.1.1	**[Presentation] Unit 4.1** Designing action plans and setting goals for entrepreneurship	Image, Hypertext, Canva presentation	15'	LO7: I can design activities that serve short term and long-term goals creating action plans
5.1.2	**[Demonstration] Unit 4.1** Smart Goals – How to properly set a goal [2:50]	Hypertext, video	15'	
5.1.3	**[Practice] Unit 4.1** Multiple choice quiz taken in study mode Task – Create your Template	Hypertext, Quizlet, Canva	15'	
5.1.4	**[Self-evaluation] Unit 4.1** Drop-Down Problems with Hints and Feedback to evaluate participants' understanding and critical thinking.	Hypertext, Drop-down problem with Hints and Feedback	15'	
5.2	**Unit 2 - Identifying opportunities and creating value for the society and economy (1 hour)**			

Activity ID [ACT_ID]	Description of Educational Activity	Digital Technologies and Features Used	Indicative Duration of Educational Activity	Link to Learning Outcomes
5.2.1	**[Presentation] Unit 4.2** Spotting opportunities, needs and challenges Fact of the day!	Image, Hypertext, Canva presentation	15’	LO8: I can spot opportunities and design appropriate activities that connect with social and economic needs
5.2.2	**[Demonstration] Unit 4.2** Entrepreneurship is seeing opportunities behind every problem [2:37]	Hypertext, video, Google Map	15’	
5.2.3	**[Practice] Unit 4.2** Match and Answer quiz Task – Create your Template	Hypertext, Quizlet, Canva	15’	
5.2.4	**[Self-evaluation] Unit 4.2** Drop-Down Problems with Hints and Feedback to evaluate participants’ understanding and critical thinking.	Hypertext, Drop-down problem with Hints and Feedback	15’	
5.3	**Unit 3 - Recap and Self-Assessment (50’)**			
5.3.1	**[Presentation] Micro-MOOC 4 recap** Page summarizing what we saw in Micro-MOOC 4	Hypertext	5’	LO7&LO8
5.3.2	**[Open Response Assessment]** Self-assessment using the Open Response Assessment feature using the relevant rubric	Open Response Assessment	30’	
5.3.3	**[Self-evaluation] Checklist: I can…** Three brief polls evaluating participants’ knowledge Word cloud feature for participants to share their impressions	Poll, Word cloud, W3Schools, Get Bootstrap	5’	

Activity ID [ACT_ID]	Description of Educational Activity	Digital Technologies and Features Used	Indicative Duration of Educational Activity	Link to Learning Outcomes
	Progress bar			
5.3.4	**[Discussion Forum]** Forum discussion feature with two topics for participants to discuss	Discussion Forum	10’	
5.4	**[Recommendations for further learning]** List with resources about the topic	Hypertext, Hyperlinks		
Day 6: Final assessment (1 hour)				
6.0	**Instructions for taking the micro-MOOC finale exam**			
6.0.1	**[Presentation] Information about the final exam** A page of text describing the minimum score the examinee must obtain and the requirements to pass the exam.	Hypertext, Image	5’	
6.1	**Final evaluation**			
6.1.1	**[Final evaluation] 5 MCQs for every Learning Outcome** Final assessment – 40 MCQs	<Quiz>	40’	LO1 – LO8
6.2	**Receiving your certificate, take away messages and what comes next**			
6.2.1	**[Presentation] Instructions on how to receive the certificate of the micro-MOOC** Page with instructions on how to receive your certificate.	Hypertext	5’	
6.3	**Micro-MOOC wrap-up and next steps**			
6.3.1	**[Presentation]** Take away messages and what’s next	Hypertext	**10’**	

CHAPTER 4: TECHNICAL IMPLEMENTATION OF THE ONLINE COURSE

In the present Chapter, we will discuss the technical implementation of the course and the steps taken to create a seamless and user-friendly learning environment with the use of multiple tools and features. For the course *Next-Gen Educators: Cultivating Digital Skills and Entrepreneurship for School Transformation*, Open edX was preferred. In Table 8 below we include the hyperlinks needed to preview the course as an instructor or learner.

In addition, we include the hyperlink to the Google Drive folder that contains the most recent backup of the course which is ready to be downloaded and imported on Open edX. Lastly, the course is accessible using the following credentials: email guest.mde777@gmail.com and password: Guest777!. Please be advised that fonts and image sizes may vary depending on the browser or screen being used.

Table 8: Course URLs and backup file

Resource	Description	URL
Online course	Online course created on Open edX (instructor's preview)	https://studio.edunext.co/course/course-v1:next-gen-educators+NGE2024+2024-Autumn
Online course	Online course created on Open edX (learner's published preview)	https://next-gen-educators.edunext.io/courses/course-v1:next-gen-educators+NGE2024+2024-Autumn/course/
Backup file	File which can be imported on Open edX permanently available on Google Drive	https://drive.google.com/drive/folders/106oZQSf84KizBKX7OydQrT6nmSkMary-?usp=drive_link

4.1 Platform choice and setting up the outline

We begin the present Chapter by discussing about the platform we chose for this course. Open edX is an ecosystem and the Edunext studio is a service provider that does not

require to be downloaded; it can be accessed through the address https://studio.edunext.co/home/. Once the account of the instructional designer has been created, setting up a new course can be easily done.

Open edX enables course designers to add multiple layers of learning content including sections, subsections and units, as shown in Figure 1 and Figure 2. This way the content can be organized and become easier to navigate as customizing the title of each layer is possible and ensures logical flow as learners can anticipate what the next step of the learning process will be.

Every micro-MOOC consisted of four sections overall, with each core section containing activities further split in four sub-sections where participants needed to engage 15' with the materials (Figure 1 and Figure 2). The structure is straightforward and aligns with the principles of micro-learning and facilitating learners with brief learning bits. Zhu (2022) in her analysis argues that the specific structure (instruction, learning materials, feedback and socialization) helping learners understand and work on a concept makes them obtain a sense of accomplishment (Zhu, 2022).

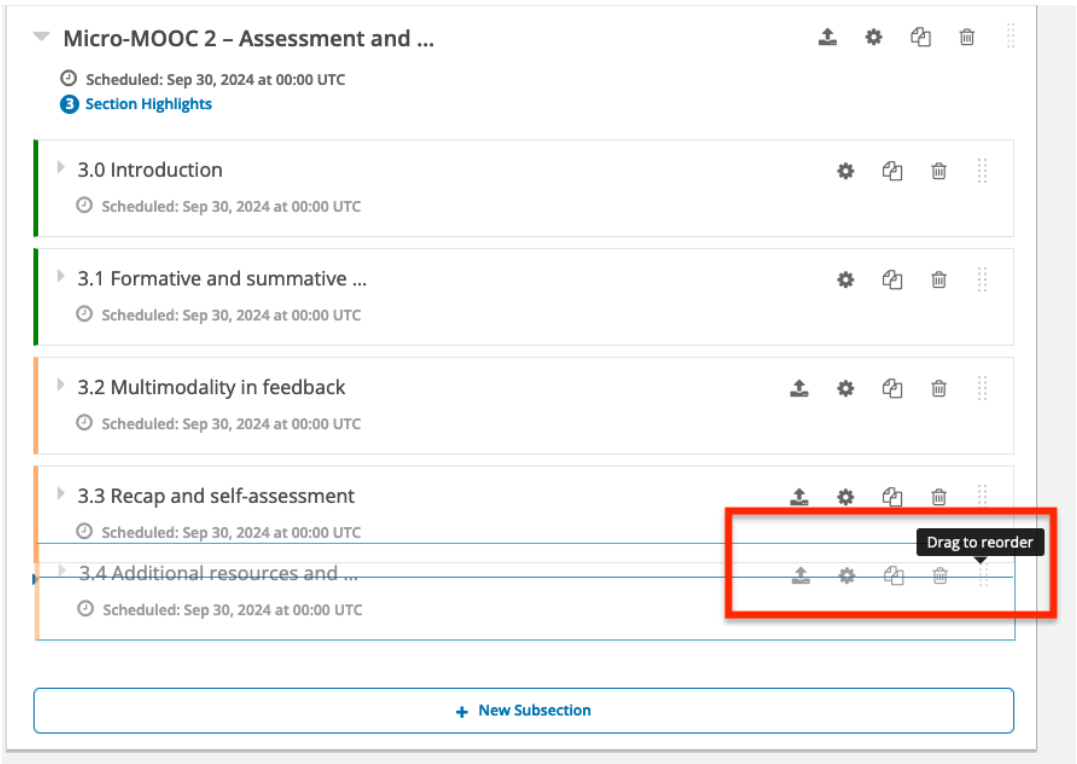


Figure 1: Course outline – Instructor's view

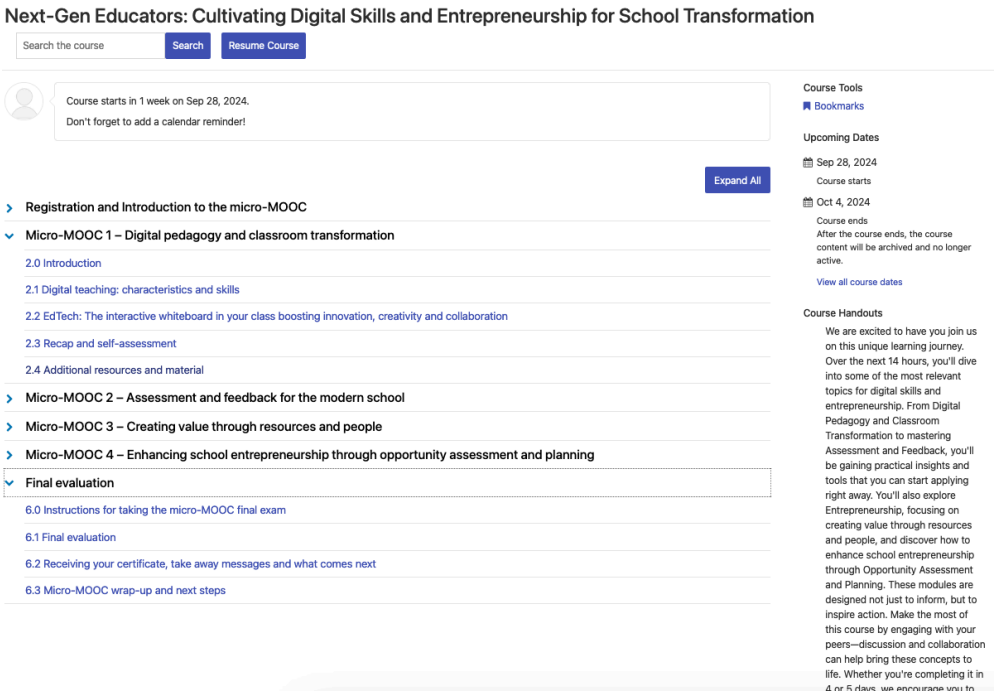


Figure 2: Viewing Open edX environment from a learner's perspective

4.2 Discussion forums

A total of eight discussion forums were used in the micro-MOOC where participants' contribution was mandatory. Participants were also encouraged to use the forum throughout the course and especially in the Practice units where the optional content-creation activities were introduced (Figure 3). Forums are a commonly used feature in online courses and are a great indicator and data source for instructional designers about learner profiles and behavior. Galikyan et al. (2021) in their research, support that "*85.47% of all interaction taking place is task related*". In addition, they found that there is a relationship between learners' cognitive engagement with the number of threads they contribute to; learners with more frequent and elaborate responses broadly participating in the forums had better grades.

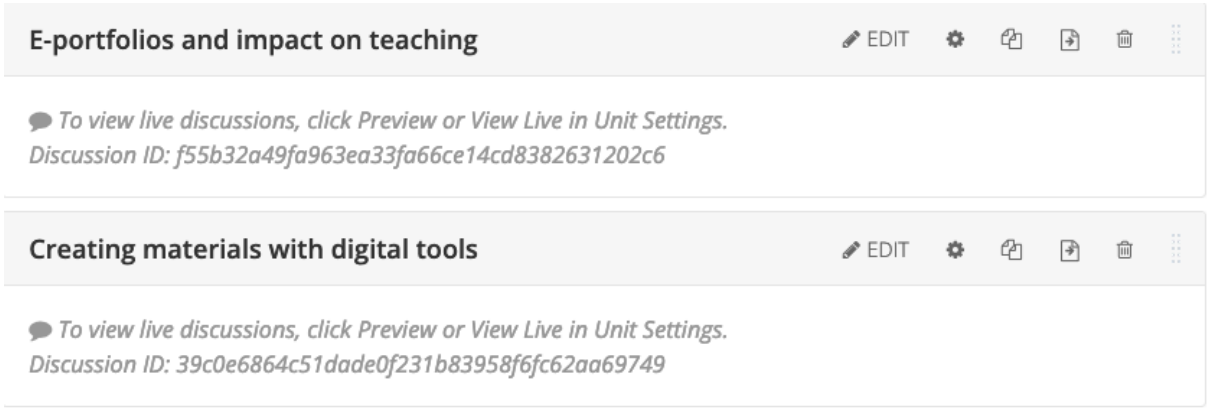


Figure 3: Embedded discussion forum feature

4.3 Integration of tools

4.3.1 Reward strategies and motivation

In the review we did in the context of Chapter 2, we saw that most online courses provide a certificate of completion at the very least following the successful attendance of a course. For the purposes of this mockup course we generated the certificate strictly for instructional purposes, adding the real name and signature of the author, choosing however a fictional title and name of organization. Open edX requires the contribution of at least two designers for quality assurance purposes, but we opted to display this feature without adding a second contributor.

Relevant research suggests that receiving a certificate is among the motivational factors for learners who enroll in a MOOC (Hew & Cheung, 2014). In the review we did in the context of Chapter 2, we saw that leading e-learning providers like Coursera not only provide certificates but assign credits that count towards advanced degrees, and this is the case for courses in Europe too where ECTS credits are given after the successful completion. To boost motivation, we have enabled the certification option on Open edX for this course (Figure 4).

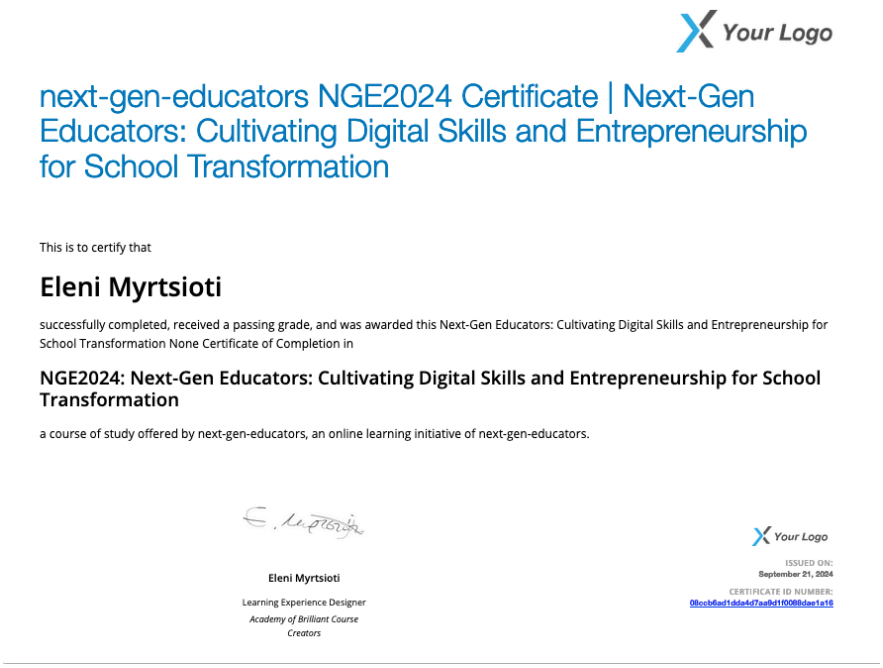


Figure 4: Mockup example of MOOC certificate

Open edX does not provide - in this version at least - a badge, which would have been another type of reward. We created and embedded two different badges. For the simple badges displaying the level we used and customized the HTML code from the open-source website Get Bootstrap and the respective category[5] (Figure 5). We also designed badges on Canva and embedded them on Open edX with HTML code that was generated on the hosting site imgbb[6]. Naturally, these are mockup badges, and an actually running MOOC would need to have a customized image, with colors and a relevant visual identity that can be downloaded and potentially be added on learners' e-portfolio.

Researchers suggest that if "*reward-based strategies are aligned with the activity's [difficulty level] and target the [previous psychological needs], they can be potentially used as motivators to engage students in MOOCs*" Ortega-Arranz et al. (2019). Indeed, to reflect that, we have included slightly different badges to reflect the change in the difficulty level as learners progress in the course (Figure 6 and Figure 7).

[5] https://getbootstrap.com/docs/4.0/components/badge/
[6] https://imgbb.com/

Figure 5: Configuring the badge

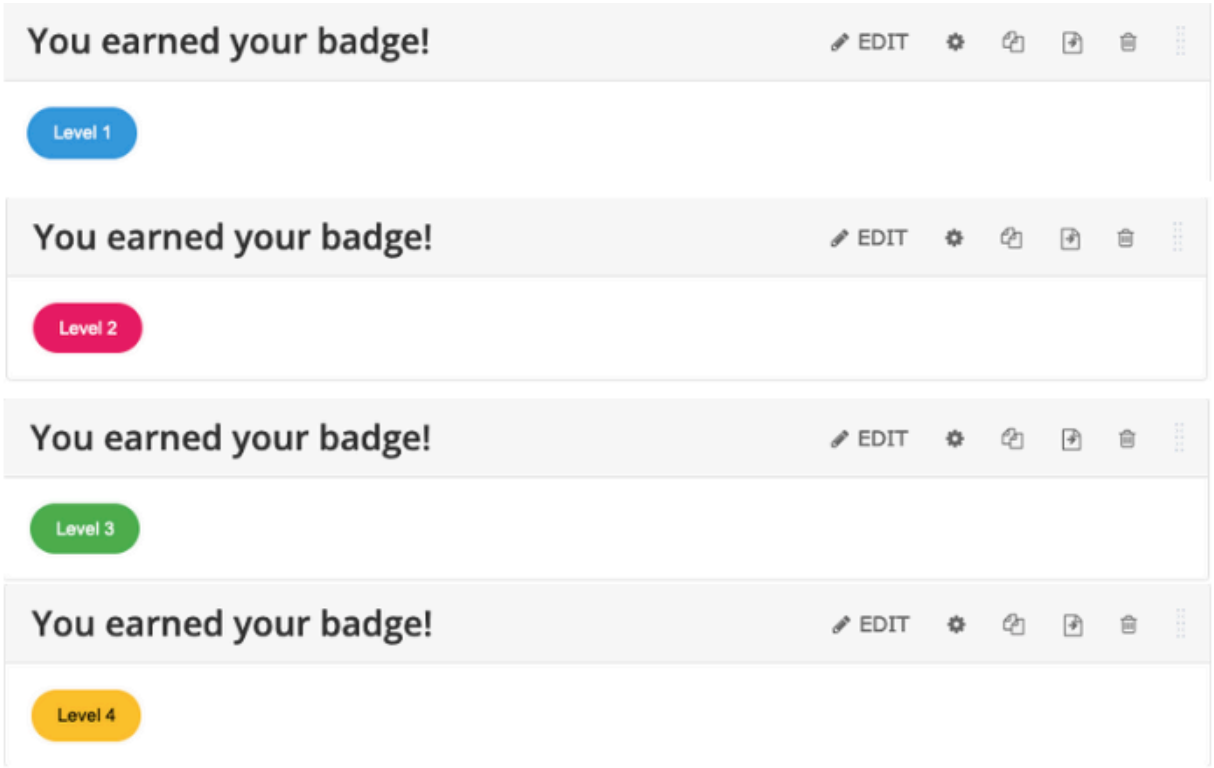


Figure 6: Badges earned in different micro-MOOCs as the course progresses

Figure 7: Colorful badges awarded in micro-MOOCs

As we saw in Chapter 2 and the review of other courses, several MOOCs have integrated the progress bar feature either in round form or as a horizontal bar. Although the content can be easily navigated on Open edX a progress bar is a great feature for participants. Since it was not available by default in the current version, we added it by customizing the HTML code found on the website W3Schools and the respective category Progress Bars[7] (Figure 8). It was added each time in the wrap-up sections below the Checklist self-assessment task and before the badges.

The bar can be customized in terms of text, width and length (Figure 8). The percentage reflecting the progress made can also change adding multiple colors. On the downside, the bar seems to slightly disrupt the platform's layout for reason unknown (Figure 9), while modifying the code did not fix the issue. There are certainly alternatives and possibly more sophisticated paid solutions to look for and try out, however, in this version of the course it was considered as a feature that added value.

[7] https://www.w3schools.com/w3css/w3css_progressbar.asp

Figure 8: Configuring the progress bar

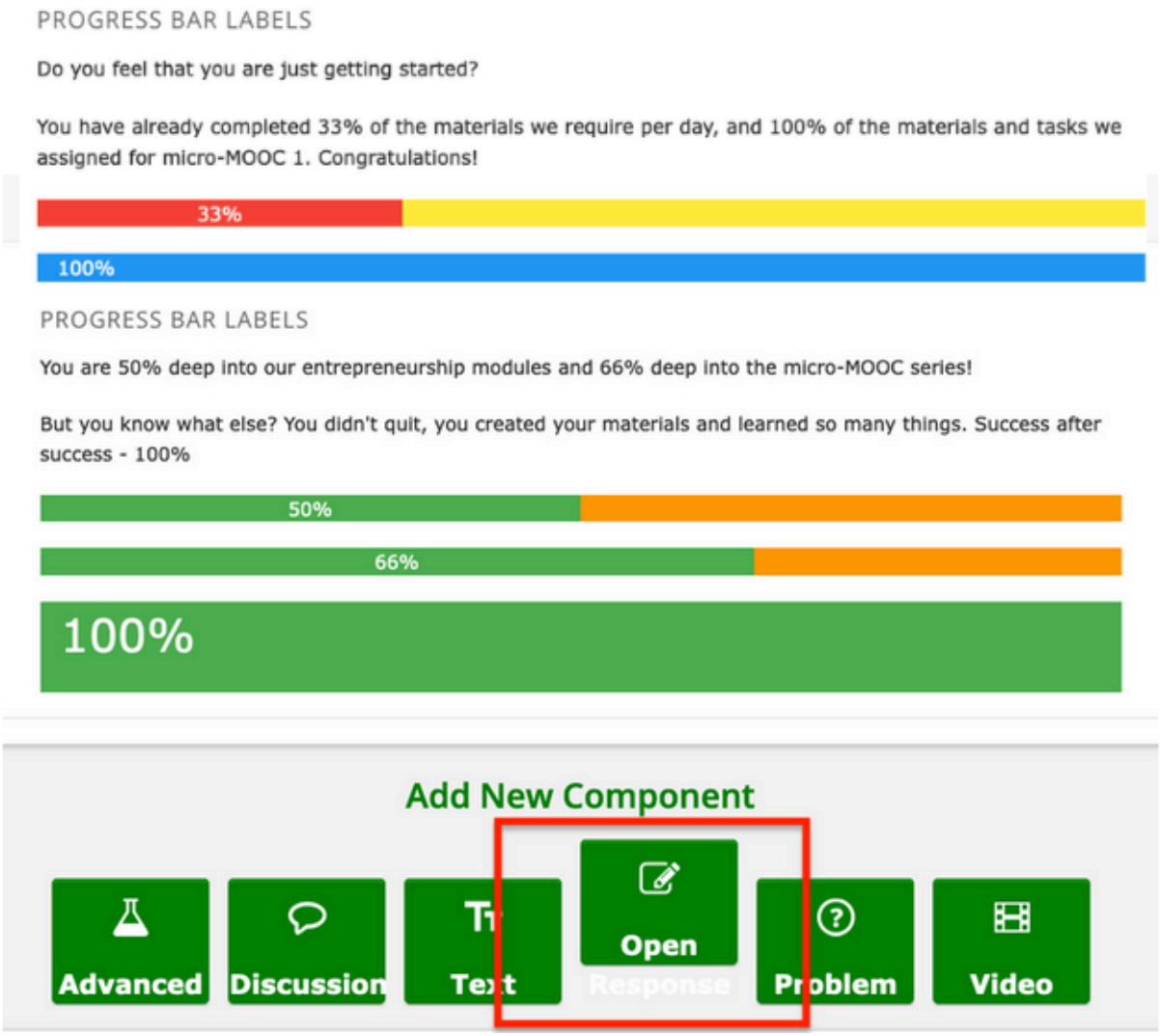


Figure 9: Progress bar layout and customization

In their research, Jivet et al. (2021) argue that "*feedback is how learners self-regulate*" and make a further distinction between task-level, process-level, self-regulation-level and

self-level feedback, highlighting that self-feedback is in fact the least effective. One can argue that progress bars and possibly badges are not essential and cannot be utilized (e.g., showcase them like a certificate), however, considering the learners' proficiency here (level B1 – Intermediate) and the topics on the micro-MOOCs, we thought that it was necessary to provide as many rewards as possible for retention and motivation reasons.

4.3.2. Assessment

We mentioned earlier that Quizlet in particular was a convenient tool for the purposes of this course because it allowed for consistency in term of use and offered variety when it comes to the modes of study and taking tests. While there are several tools that can be used for assessment purposes of this type (interactive, brief and engaging) adding multiple tools that may cease to function over time was not an option.

In Figure 10 we can see how the end user, our learners, see two embedded tools in the published version of the course on Open edX: Quizlet provides learners the possibility to change the mode of study. Every time this tool was used the recommended mode was indicated (flashcards, match and answer, and test). However, participants still have the option to experiment with the tool if they wish to do so.

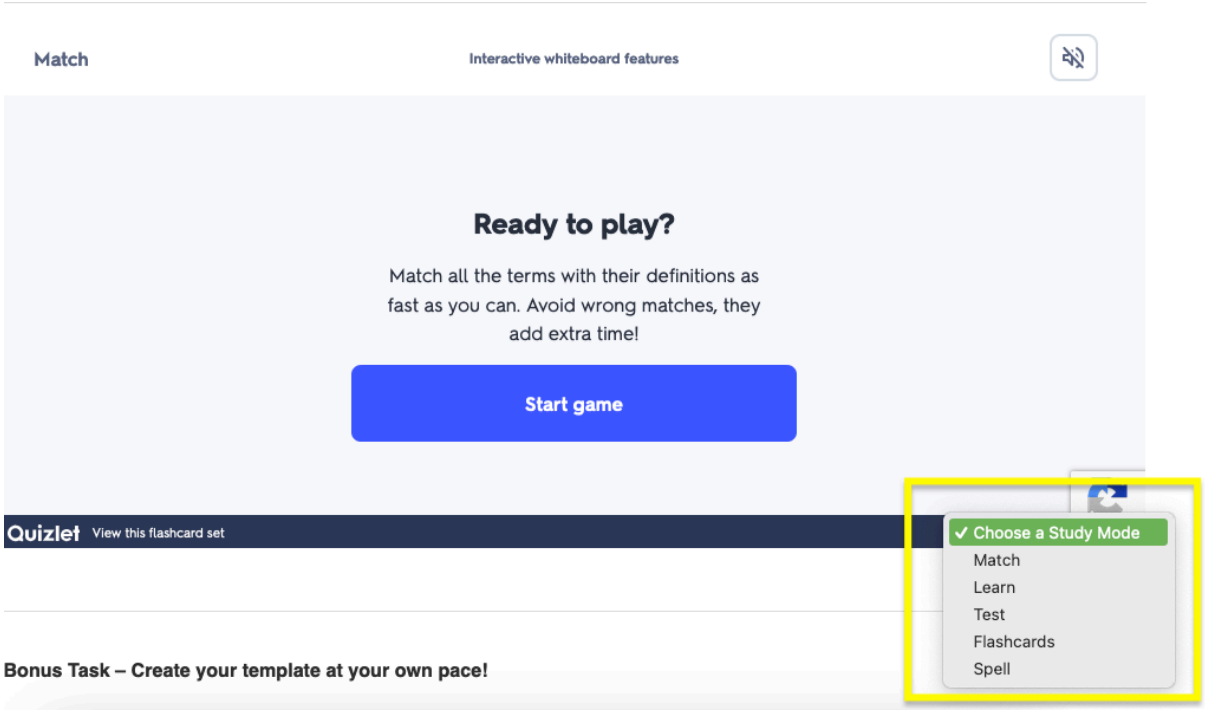


Figure 10: Quizlet study modes

Other online tools used for assessment purposes include Quizizz and Google Forms. While these tools, very much like Quizlet, are engaging and easy to use, they have collectively a disadvantage and that is the inability to export directly the data file with learners' responses, unless there is an account in these third-party applications. Something like that however, would not be convenient in case more than one instructors coordinate the course (Figure 11 and Figure 12 respectively).

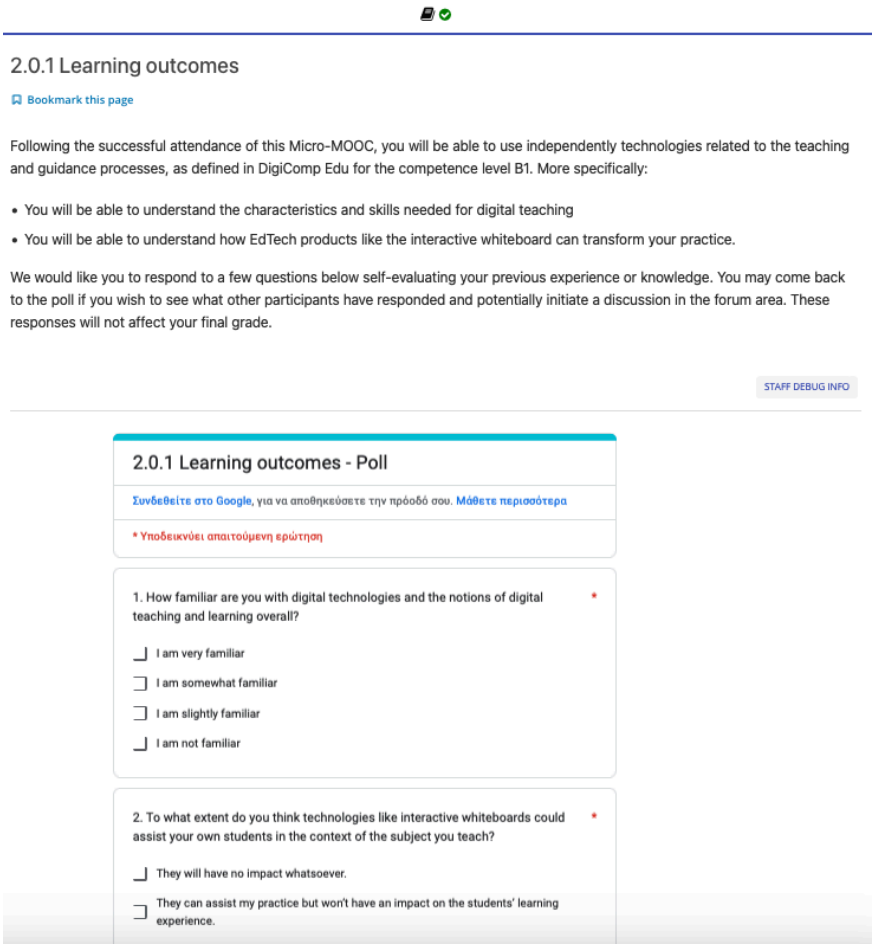


Figure 11: Poll hosted on Google Forms

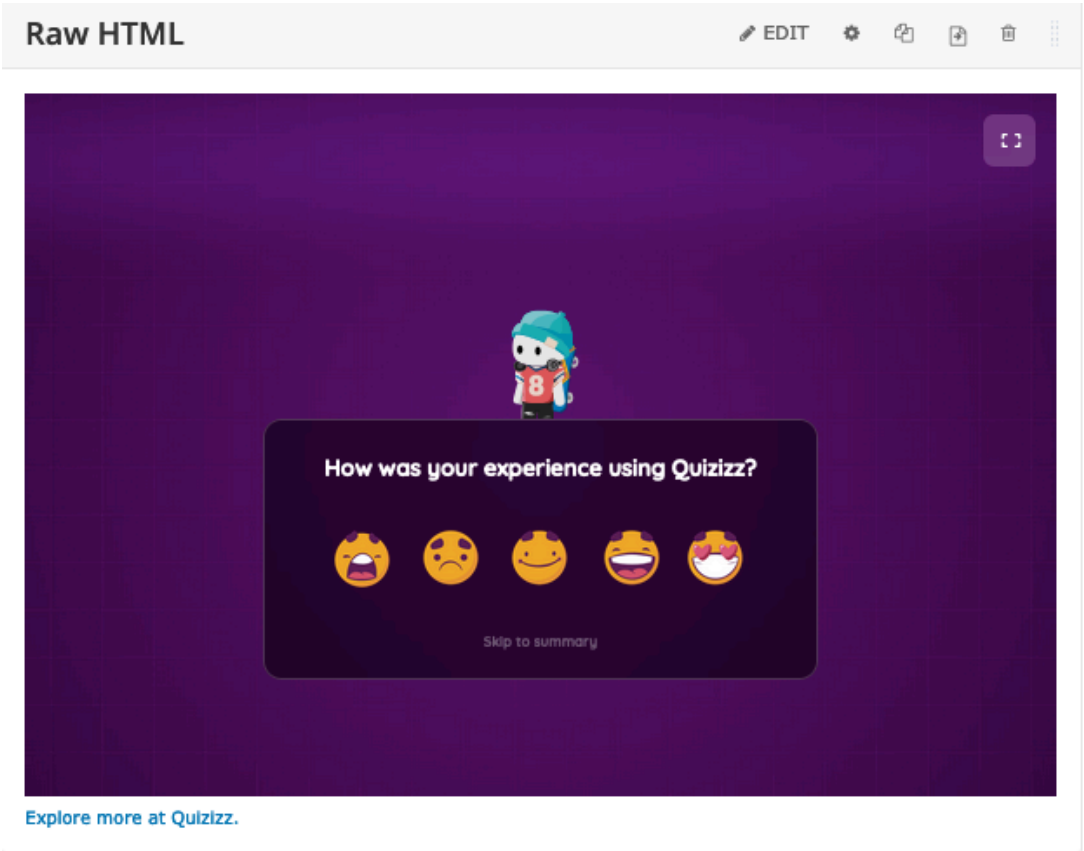


Figure 12: Feedback question hosted on Quizizz

Throughout the micro-MOOC series a number of mind-maps tools and applications mirroring the whiteboard were used. This was a conscious choice because interactive whiteboards and their use were included in the learning outcomes, and these applications will most definitely help learners understand their use, layout, interactive features and tools. These tools were introduced mainly as optional tasks following the brief assessments in the Practice units (ActID 3.2.3 and 4.1.3).

The integration of tools like mind maps and timelines enhance visual learning, and the nature of the tasks is to engage learners in collaborative work (all these tools can be shared with more users), hands-on practice and a gradual introduction to modifying layouts and potentially light configuration and programming. Below, we include examples of Coggle (Figure 13), Preceden (Figure 14) and Miro (Figure 15).

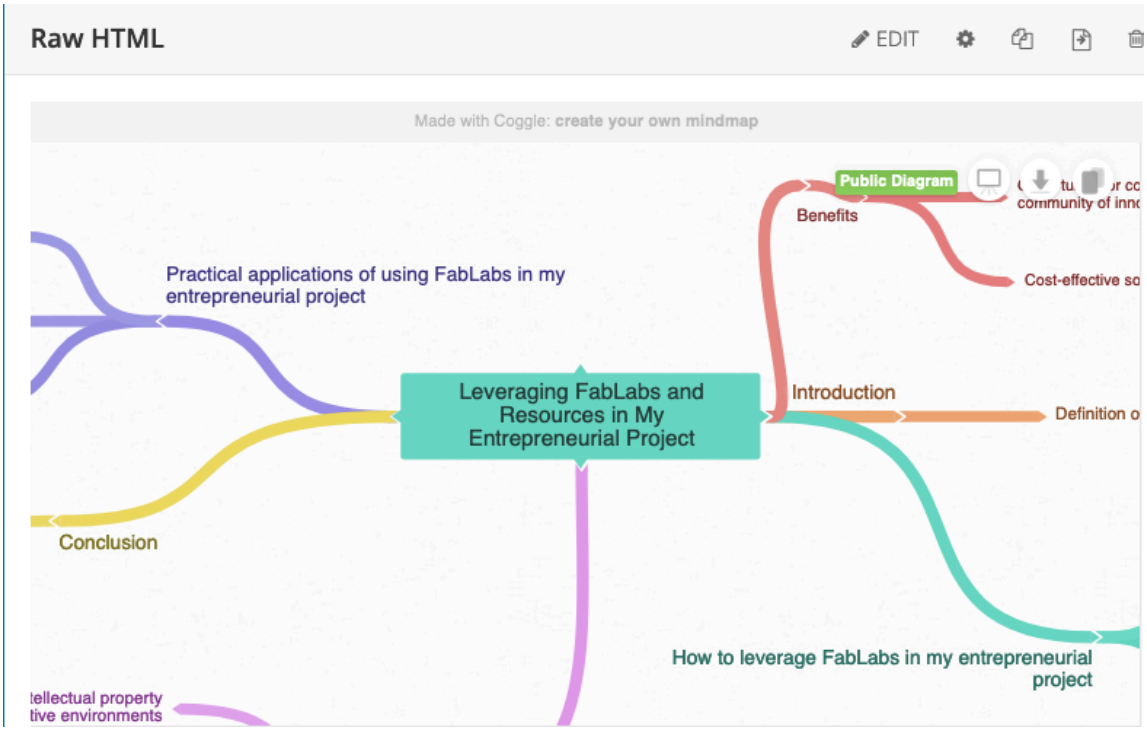


Figure 13: Coggle tool for mind maps

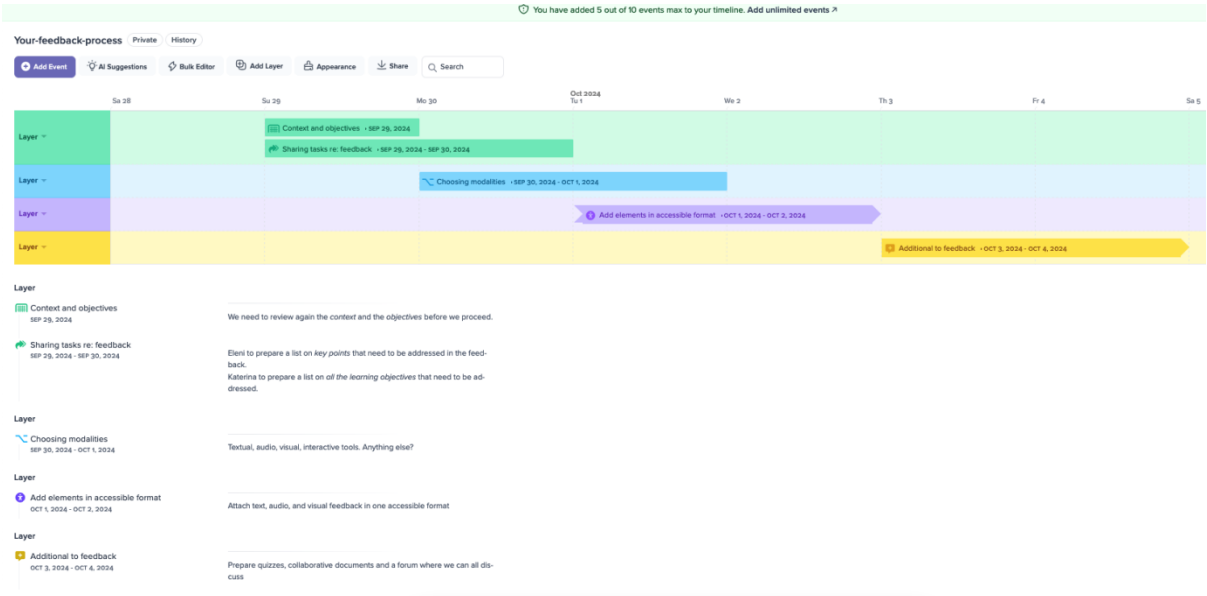


Figure 14: Preceden Interactive timeline tool

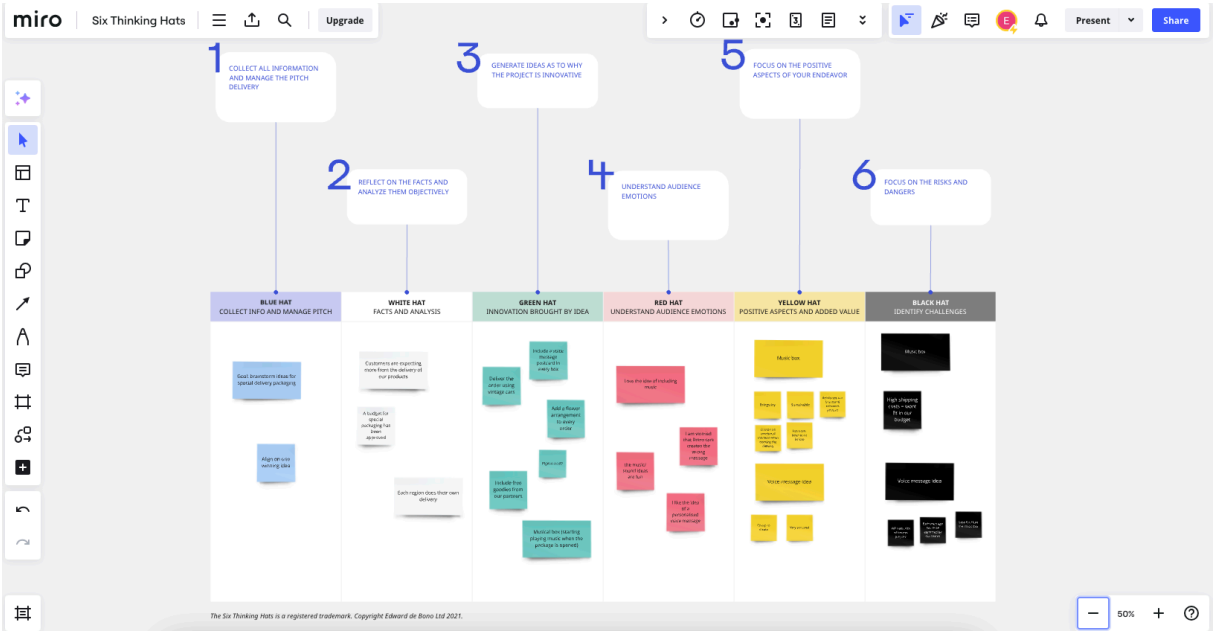


Figure 15: Miro whiteboard application featuring De Bono's Six Thinking Hats

The tools were selected each time based on the context of the learning outcome and the content overall. For example, in Activity 5.2.2 we discussed about opportunities and we displayed an open-source website Our World in Data and Google Maps. This website, which is also embedded, for instructional purposes and to be used later on, was described in the brief video that was created for this unit, where the creation of multiple layers on Google is also explained (Figure 16). This is an example of appropriate synergy between content, tool and activity.

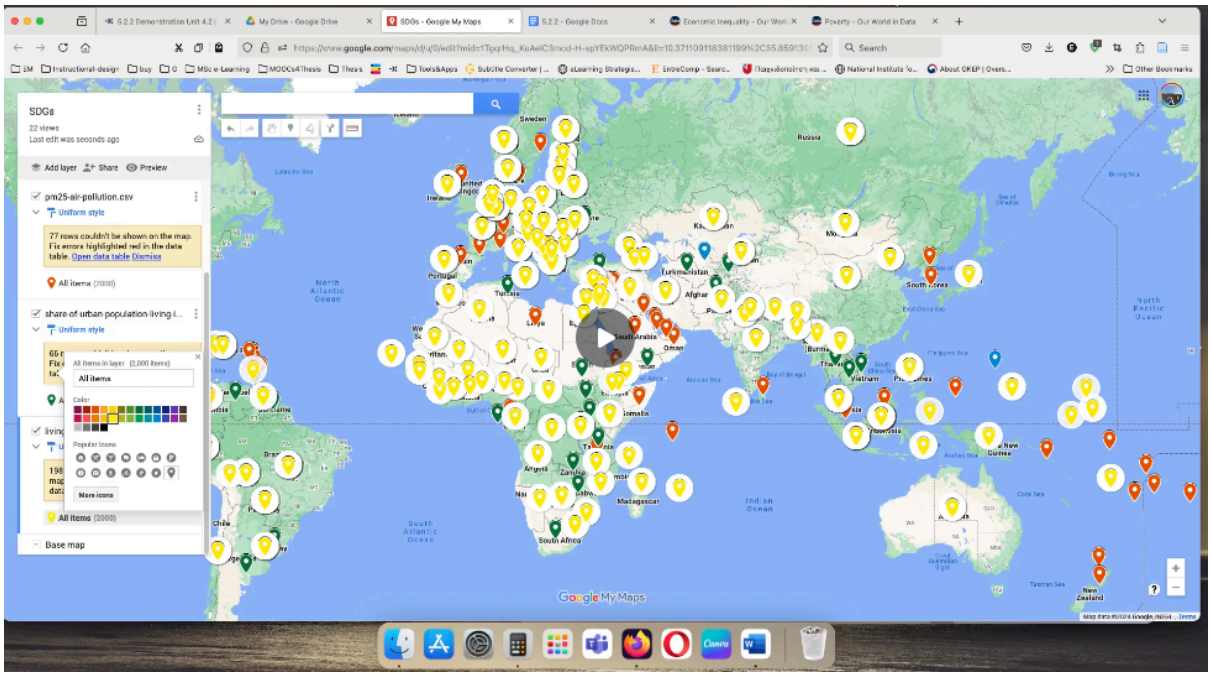


Figure 16: Google Maps and layers used in the context of entrepreneurial skills

4.4. in-built assessment features

Studies on the design and development of programme-focused assessment strategies, argue that "*successfully creating a cohesive, programme-focused assessment strategy allows a programme team to ensure that students receive adequate opportunities to demonstrate their learning. It mitigates over and under reliance on particular assessment techniques, enriches the type of feedback provided to students, and ensures the assessment mix is spread over a student's entire journey of study*" (Brunton et al., 2016).

This course heavily emphasized on assessment. Third party tools we used as we saw earlier, including Google Forms, Quizlet and Quizizz, however, multiple in-built tools that Open edX provides were used. We demonstrate as indicated in Figure 17, Figure 18 and Figure 19 the Problem with Adaptive Hint, Image Mapped Input, and Dropdown Problem with Hints and Feedback respectively in addition to the standard Poll and Multiple-Choice Questions that were also used in the course. We are in complete agreement with Brunton et al. that an assessment mix throughout the course is necessary, as they become progressively more challenging and they don't demotivate learners. Open edX encourages instructional designers to add multiple content blocks in each unit, suggesting that diverse learning content enhances the learning process. In theory, a very brief quiz like the ones we just mentioned, would check learners' understanding without heavy engagement.

The use of Dropdown problems with Hints and Feedback is a recent addition to the platform and allows course designers to add come clues in the form of hints to facilitate learners; just like in every assessment in the course, apart from the final assessment, we opted to assign zero points for this type of knowledge check and the possibility to review the answer is given after a certain number of efforts to avoid demotivating learners (Figure 19). Lastly, when it comes to in-build tools we used the Open Resource Assessment four times, adding scenarios where learners had to think critically and we also included a rubric as indicated (Figure 20).

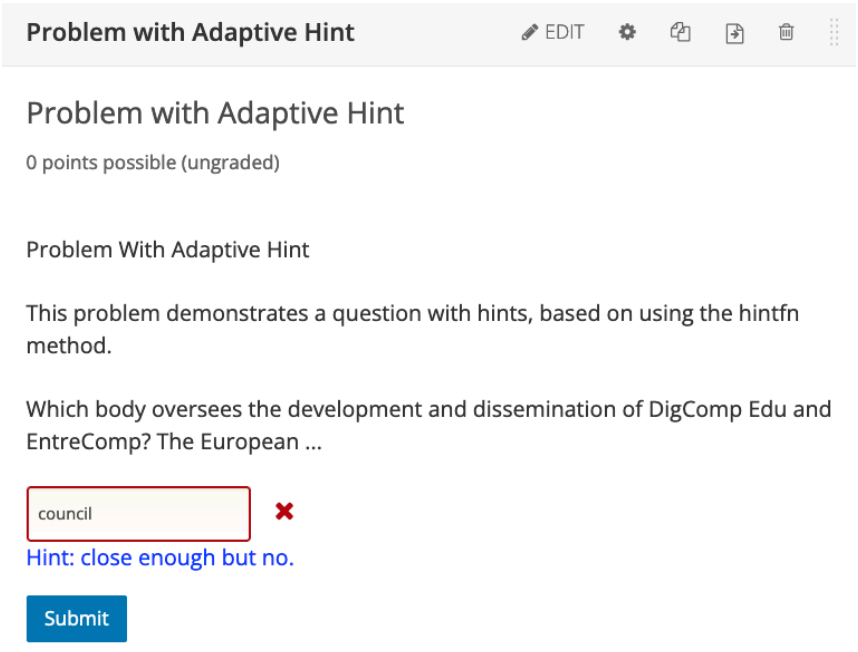


Figure 17: Problem with Adaptive Hint

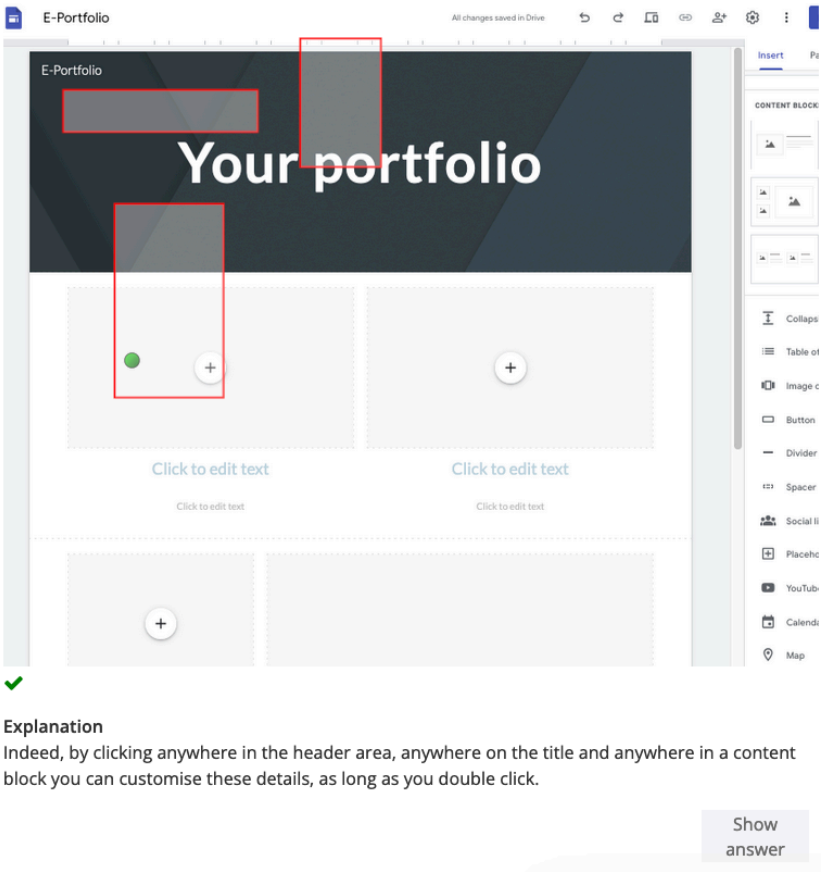


Figure 18: Image Mapped Input

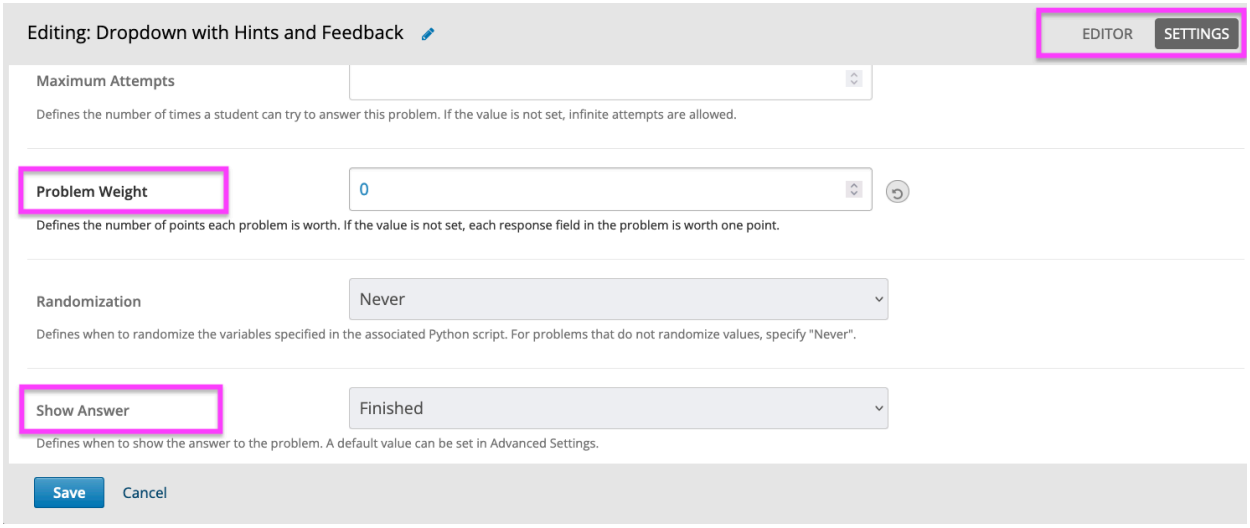


Figure 19: Configuring the problem weight and number or attempted responses in the Dropdown Problem with Hints and Feedback

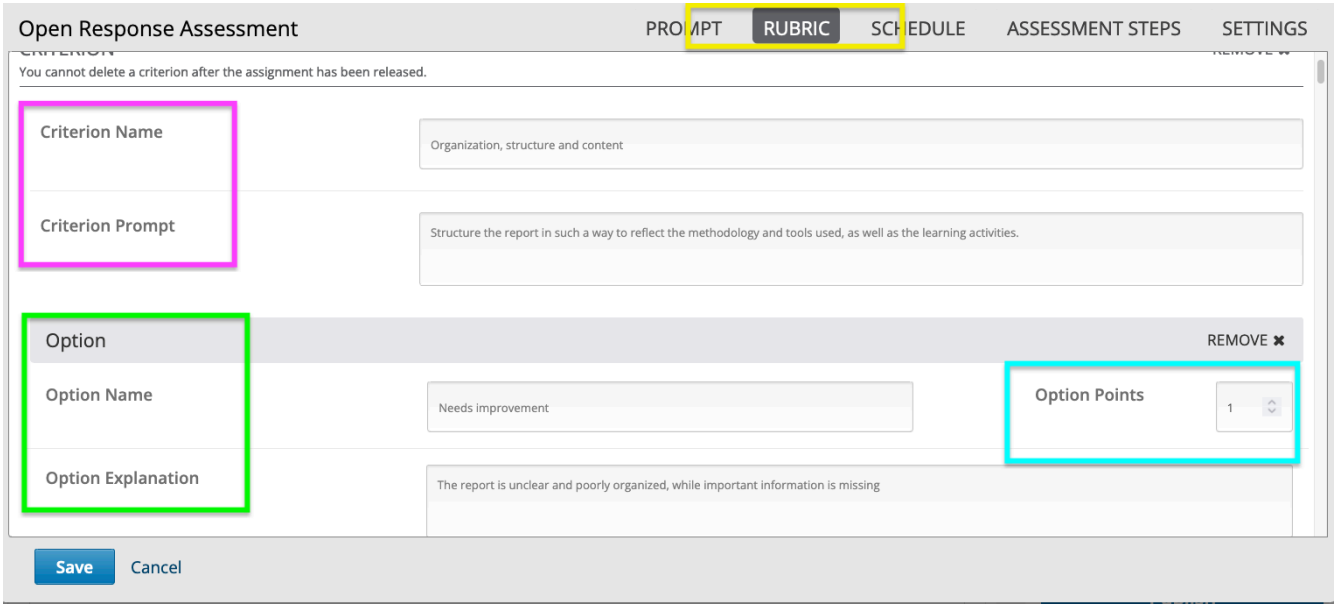


Figure 20: Open Response Assessment choices

4.3 Use of videos and mobile friendly layout

When it comes to uploading videos in particular this can be done either by selecting Video from the panel and then copy paste a URL from a hosting site like Vimeo or YouTube, or directly upload the video to the edX video pipeline following the steps Content > Files & Uploads. In this specific micro-MOOCs series all the videos were downloaded and uploaded on Open edX, this was also the only way to add subtitles using .srt files that were created specifically for this purpose. Nevertheless the system appears to have a glitch and has not

detected the respective action, therefore it didn't mark this item on the checklist (Figure 21).

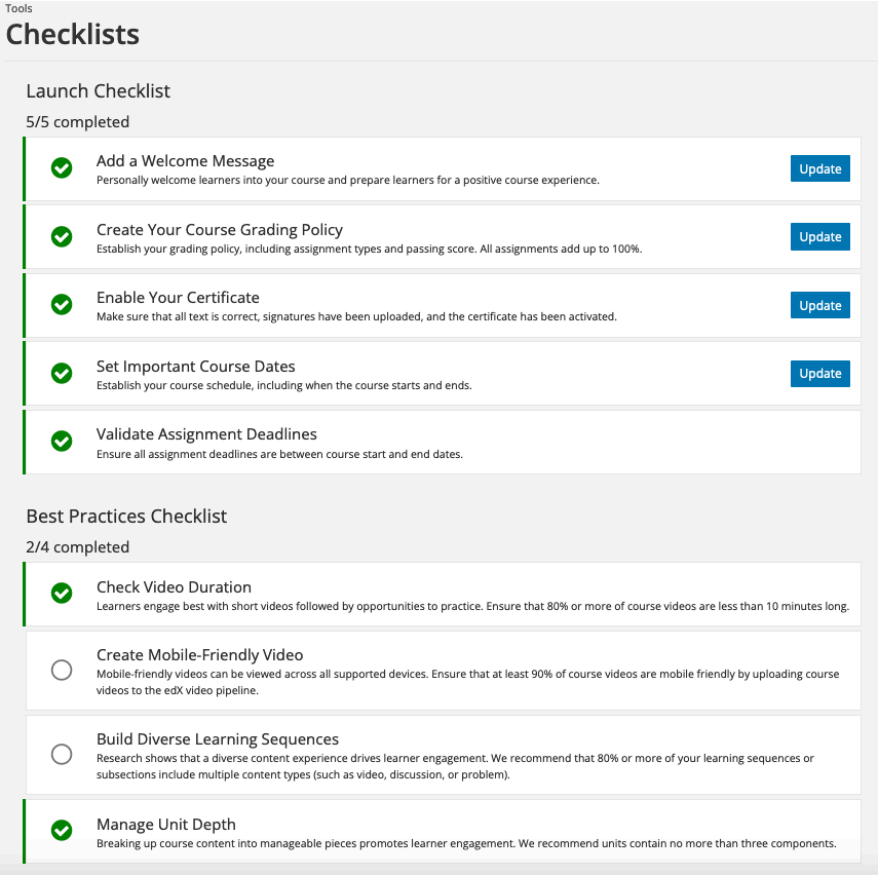


Figure 21: Checklist with recommended use of various features

Open edX is a mobile-friendly platform and its elements can be displayed from every monitor or mobile device equally well, we include below a screenshot taken on a mobile device (Figure 22).

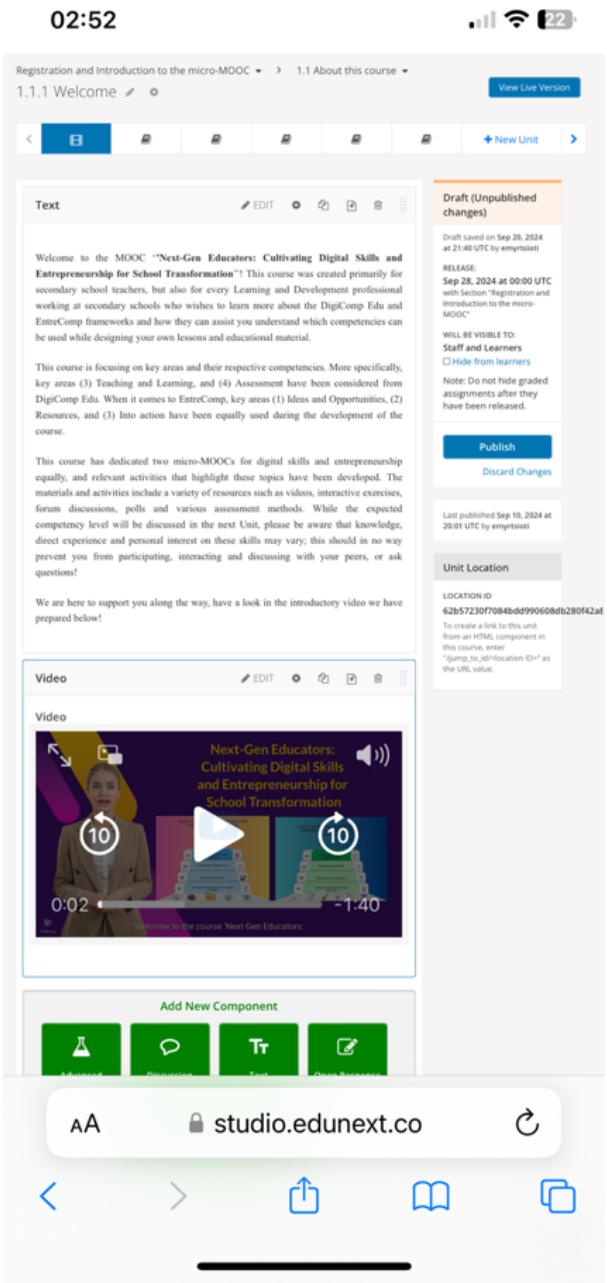


Figure 22: Open edX as displayed on a mobile device

A total of ten videos were used in the course, six of which were created by the author. Details are outlined in Table 9. The two introductory videos were created with the tool Vidnoz AI (Figure 23). Since they were not instructional videos, this tool was preferred because it gave the option of an avatar and an automatically generated voice provided that the script was uploaded in the tool. For the other videos the recorder installed in the Macbook was used and the videos were assembled and downloaded from the tool Canva. The scripts were drafted on Google Documents, downloaded and converted in .txt and .srt

formats with the use of the free tool Go Transcript[8]. Following this procedure, they were uploaded on YouTube and Open edX.

Recent studies focus on the video style and categorize them as 'speaker-centric' or 'media-centric' meaning that it features items related to the content (Deng, 2024). The objective in the videos that were created and used was to inform and instruct participants therefore even the videos found on YouTube were media-centric and did not place emphasis on the instructor.

The use of videos in MOOCs is a prerequisite, MOOCs may vary in terms of interactive features, structure or any other element but they always include videos. Relevant research has highlighted that diversified tasks can be used in courses based on videos depending on the audience and whether the learner is an expert on the topic or not (Stöhr et al., 2019). While this is an interesting prospect and most certainly needs the instructor's intervention and complex data analysis, it is in line with personalization.

Figure 23: Creating videos with Vidnoz AI

Table 9: Videos used in the micro-MOOCs

ActID	Title	URL	Created by author	Subtitles used
1.1.1	Welcome video	https://www.youtube.com/watch?v=iZ_KironnXk&feature=youtu.be	Yes	Yes

[8] https://gotranscript.com/subtitle-converter

ActID	Title	URL	Created by author	Subtitles used
1.4.2	Introducing the DigCompEdu and EntreComp Frameworks	https://www.youtube.com/watch?v=WPl692Mk_r8	Yes	Yes
2.1.2	Create Your Portfolio on Google Sites	https://www.youtube.com/watch?v=uki2CZIut2s	Yes	Yes
2.2.2	How to Use the Easy Interactive Tools in Whiteboard Mode	https://www.youtube.com/watch?v=uki2CZIut2s	No	Yes
3.1.2	Using Google Forms and Canva for Formative and Summative Assessment	https://www.youtube.com/watch?v=CNYT2kepfgw	Yes	Yes
3.2.2	Using digital tools for multimodal feedback	https://www.youtube.com/watch?v=skv_RVs9kF4&feature=youtu.be	Yes	Yes
4.1.2	Tina Seelig: Classroom Experiments in Entrepreneurship	https://www.youtube.com/watch?v=VVgIX0s1wY8	No	Yes
4.2.2	THE PERFECT PITCH in 4 minutes | How to create one for your future investors?	https://www.youtube.com/watch?v=QYPWGBxpejM	No	Yes
5.1.2	Smart Goals – How to properly set a goal	https://www.youtube.com/watch?v=K5W3tRMpPwc	No	Yes
5.2.2	Entrepreneurship is seeing opportunities behind every problem	https://www.youtube.com/watch?v=Hb8TC-dDaAk&feature=youtu.be	Yes	Yes

4.4. Presenting the main content

The main tools to add text on Open edX in every unit of the course, was the in-built content block and Canva. The text was either transferred from a Word or Google Document directly on Open edX or was copied in a template chosen and adapted on Canva. Canva was preferred as opposed to Google Slides or Power Point because it is visually more appealing and displays a series of highlighted visual cues indicating how many slides learners need to browse still (Figure 24).

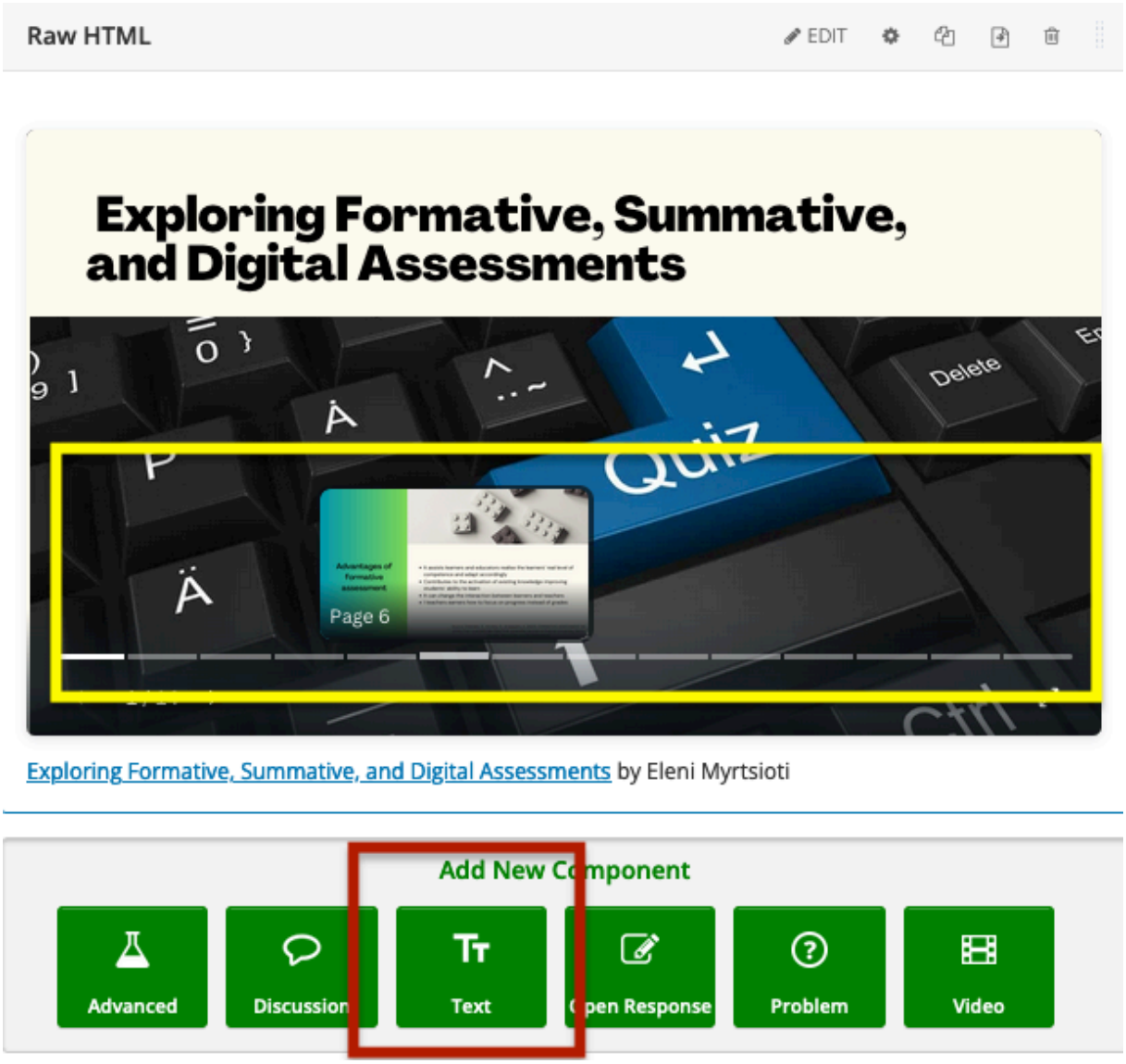


Figure 24: Adding text on Open edX

Integrating a variety of tools and technologies such as videos, interactive presentations, mind maps, maps, open-source code, assessment applications, edX's built-in assessment features, whiteboards, timelines, and podcasts greatly enhances MOOCs, particularly those focused on digital and entrepreneurial competencies. Videos (and podcasts) can showcase real-world business scenarios and digital skills in action, making abstract concepts more tangible. Interactive presentations, mind maps, and timelines help in breaking down entrepreneurial frameworks and project management strategies, making them easier to grasp and apply.

Open-source code and assessment tools are essential for teaching digital literacy and coding, allowing learners to engage in practical exercises and self-assessment, while whiteboards can facilitate brainstorming sessions and idea mapping, crucial for entrepreneurial planning and innovation. For schools, using the diverse tools demonstrated in this micro-MOOCs series means an advantage for teaching essential 21st-century skills. Most importantly these are tools that can be used readily by teachers and some of these companies like Canva, either provide their materials for free or are working on special plans for educators specifically.

In conclusion, all these tools provide for teachers and students a flexible and scalable way to equip students with the digital literacy and entrepreneurial mindset needed to thrive in a rapidly evolving job market, while also fostering a collaborative and dynamic learning environment.

CHAPTER 5: EVALUATION OF THE ONLINE COURSE

5.1 Course design

During the preparation of this online course, our main concern was to illustrate the best way possible the value of the two frameworks and ways to incorporate them in education. Consequently, the choice of learning outcomes, activities, assessment and content overall was prepared while keeping in mind how we can assist schools and teachers to delve into the domains of digital and entrepreneurial skills.

The structure of the course allowed for flexibility and more examples will be provided in the present Chapter. The course provides a solid foundation for those considering introducing their students to these topics with a few points to take into account for its seamless execution such as the time allocation for each task and including as many resources and assignments as possible for learners to practice. Overall the course was successful in meeting its goals and further improvements can be made for future re-runs such as supporting diverse learning paces and integrating live sessions for real-time interaction between learners and instructors.

5.1.1 Learning outcomes

The exact definition of the eight learning outcomes that were chosen for the creation of this micro-MOOC series, was original and each one was conceptualized following relevant readings and personal experiences and beliefs after working closely with teachers who use digital tools or design lesson plans. As mentioned earlier, DigCompEdu and EntreComp were used as points of reference and greatly facilitated the choice and exact phrasing of the learning outcomes, especially those about entrepreneurial skills, as they had already established a foundation by defining specific proficiency levels. A detailed overview can be found in Table 10.

Table 10: Learning outcomes and their respective frameworks, competence areas, skills and levels

Learning outcome	Framework	Area of competence	Skill	Level
Understand the characteristics and skills needed for digital teaching	DigCompEdu	Teaching and Learning	Teaching	B1 Integrator

Learning outcome	Framework	Area of competence	Skill	Level
Understand the characteristics and skills needed for digital teaching	DigCompEdu	Teaching and Learning	Collaborative learning	B1 Integrator
Design and implement effective assessment strategies for digital learning environments	DigCompEdu	Assessment	Assessment strategies	B1 Integrator
Give feedback using digital tools and multimodality	DigCompEdu	Assessment	Feedback and planning	B1 Integrator
Evaluate and utilize different resources at their disposal to maximize their impact	EntreComp	Resources	Mobilizing resources	Intermediate - Experiment[9]
Form and coordinate a team ensuring that everyone to work collaboratively towards a common entrepreneurship project	EntreComp	Resources	Mobilizing others	Intermediate - Experiment
Design ana action plan and activities that serve short term and long-term goals	EntreComp	Into Action	Planning and management	Intermediate - Experiment
Spot opportunities to design appropriate activities that reason with social and economic needs	EntreComp	Ideas and opportunities	Spotting opportunities	Intermediate - Experiment

The learning outcomes were covered sufficiently through the materials created which were originally produced for the needs of this course with the exception of four videos, and included videos, presentations, interactive assessments, and the possibility to use a significant number of third-party tools. Examples were given readily and they were complemented with the respective pedagogical theories and approaches.

[9] As opposed to the next level Intermediate - Dare

5.1.2 Alignment of learning outcomes with the assessment

The learning outcomes were supported by various modes of assessment. In the polls and quizzes used, memorization and retrieval questions were asked (fact-based). In Figure 25 we have included an example of that from the multiple-choice questions at the end of course. While all problems and scenarios for self-assessment purposes in the more advanced units of the course take into consideration pedagogy, in the multiple-choice questions specifically we have dedicated 16 out of 40 questions checking their understanding of pedagogy. For every learning outcome five questions have been prepared with the first three assessing general knowledge regarding the outcome and the last two assessing their pedagogical knowledge.

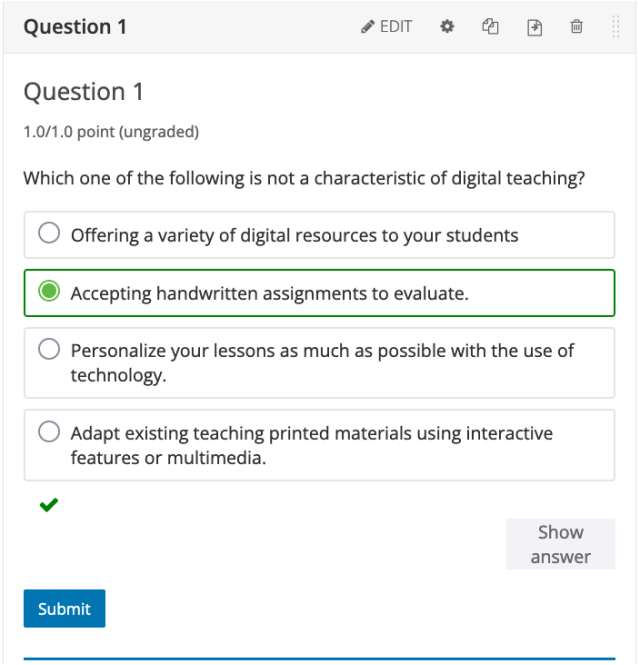


Figure 25: Multiple choice quiz to assess learners' knowledge

5.1.3 Choosing appropriate tools for the activities

We saw in the previous Chapter that various tools were considered for the needs of this course to design activities that introduce learners to new information encouraging the same time to assess their knowledge; likewise, many tools were considered to enable them to create their own content.

For example, while discussing opportunities and creating value, we demonstrated to learners in the video we created how to create, customize and embed their own Google

Maps. We had already reviewed how to use Google Sites for the creation of an e-portfolio, showing to participants how they can gradually design, collect, share and use their materials.

The assessment applications Quizizz and Quizlet were used to create tests, and Canva was used heavily to embed templates from the site encouraging participants to work on them to create their own portfolio of materials, in the self-paced tasks (Figure 26). For the same purpose whiteboard, mind map and timeline applications were used in the Practice sections to further support assessment, examples include Coggle, Preceden and Miro; a more detailed review of these tools can be found in Chapter 4.

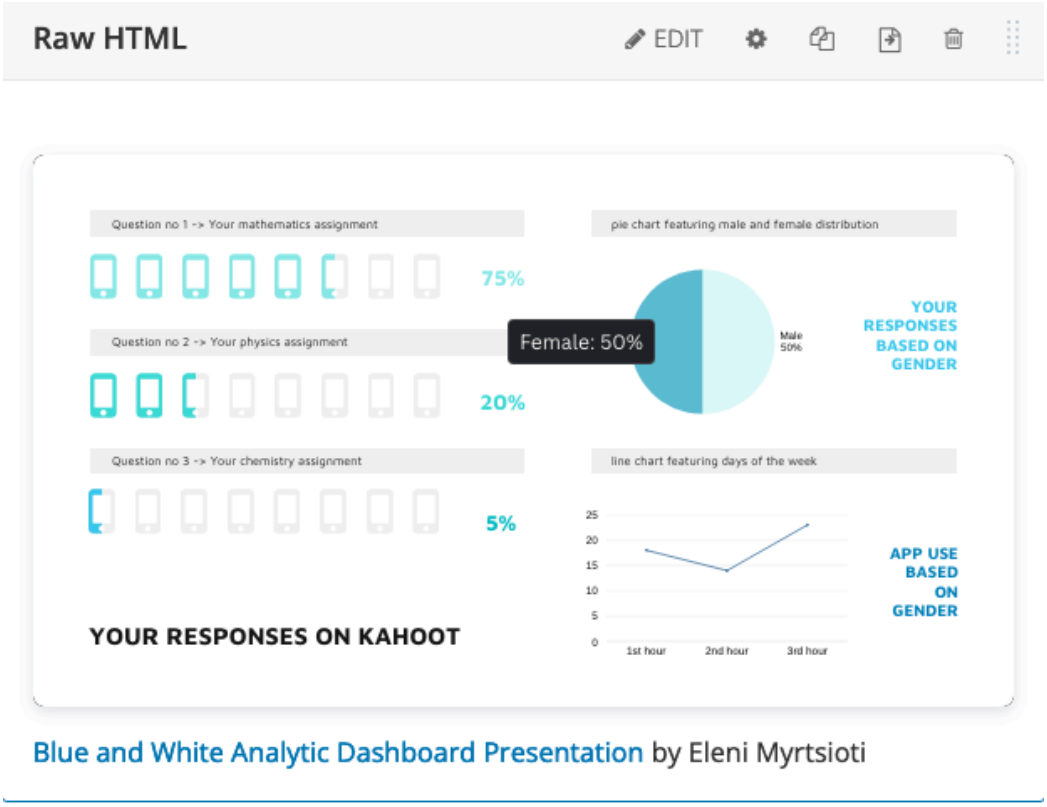


Figure 26: Canva templates corresponding to the content of each unit

5.1.4 Duration and workload

Considering that the use of micro-MOOCs did not allow for the use of very detailed and time-consuming tasks, we tried to comply with a uniform outline structure and assign activities that can be completed in 15' for most units. This was not a considerable challenge

for the Presentation, Demonstration, Self-assessment and Wrap-up units were presentation and videos were incorporated for the most part.

Creating the Practice units on the other hand, was challenging. Micro-MOOC participants still need to practice and complete hands-on tasks at their own time and pace; in addition forum discussions should not be used for the exchange of ideas and questions only, but to showcase one's work and receive feedback. In every Practice section, we took the opportunity to add an additional 'Bonus' task to be completed at their own time. We provided a question or problematic and a tool so participants can experiment and reflect outside the platform environment which may have increased their workload. As discussed in Chapter 4 most MOOC participants do not interact as much as they should not even with videos (Sinha et al., 2014), and these tasks require more than 15', therefore they were added as optional.

5.2 Course implementation

5.2.1 Integration, overall appearance, and graphical representation to support the learning experience,

It can be confirmed that the course as transferred on Open edX mirrors entirely the structure provided in the Annex of this thesis. Learners' coherent navigation and overall experience are guaranteed and the use of sections, sub-sections and units reinforce understanding. Apart from aesthetic uniformity, learners don't have to familiarize themselves with inconsistent structure. A detailed graph representing each unit and the respective media or tools used in it has been created with the use of Draw.io and is available in the Annexes.

5.2.2 Utilization of a variety of digital and educational technology tools

Tools like interactive simulations, collaborative platforms, and multimedia resources foster engagement and promote active participation. Examples of tools have been previously mentioned in this thesis, and their use was meant to improve learners' overall experience by catering to diverse learning styles and needs. It is noteworthy that Open edX proceeded with a considerate update when it comes to Edunext studio and the new additions are very promising indicating that even less third-party tools might be needed in the future.

5.2.3 Self-assessment and feedback for learners

This brings us to our next point in discussing one of the newest problem types that the most recent version introduced. We mentioned earlier in Chapter 3 that several MOOCs are self-paced and remain open for a considerable amount of time which does not facilitate the prompt communication between learners and/or instructors. All the problem types now provide the option to add hints as a form of feedback and this feature has been used extensively (Figure 27).

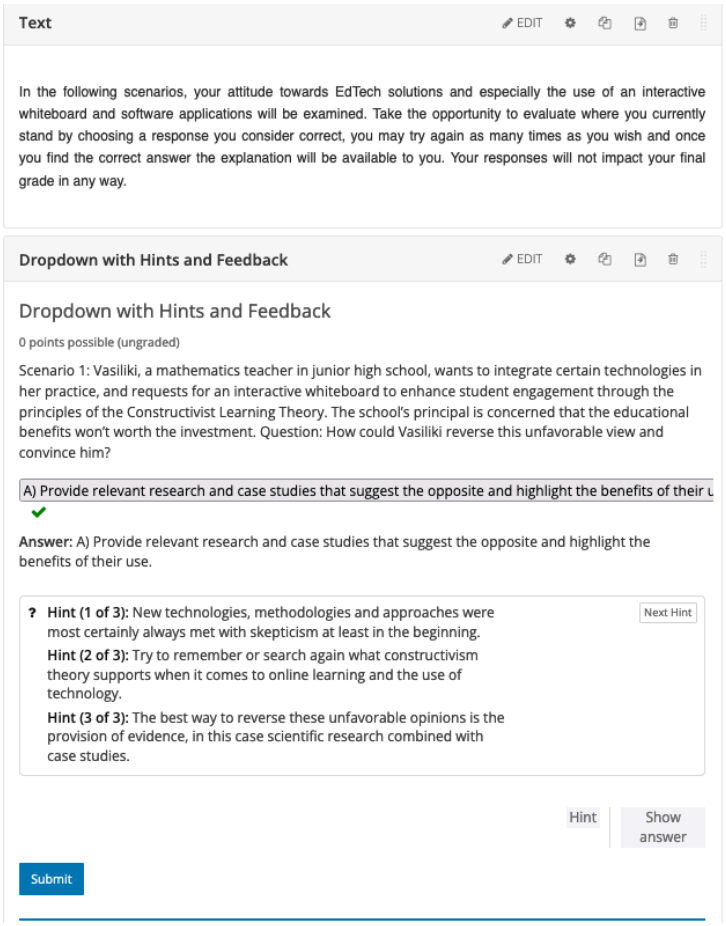


Figure 27: Finalized example of a Dropdown problem with hints for feedback purposes

5.2.4 Interaction between learners

Interaction between learners is facilitated through the Discussion Forum mainly, and with the addition of a Padlet in the introductory section (Figures 28). All learners can start new threads or add their responses, and the forum is a platform for learners to share ideas, ask questions, and discuss course materials in depth, enhancing understanding through peer interaction.

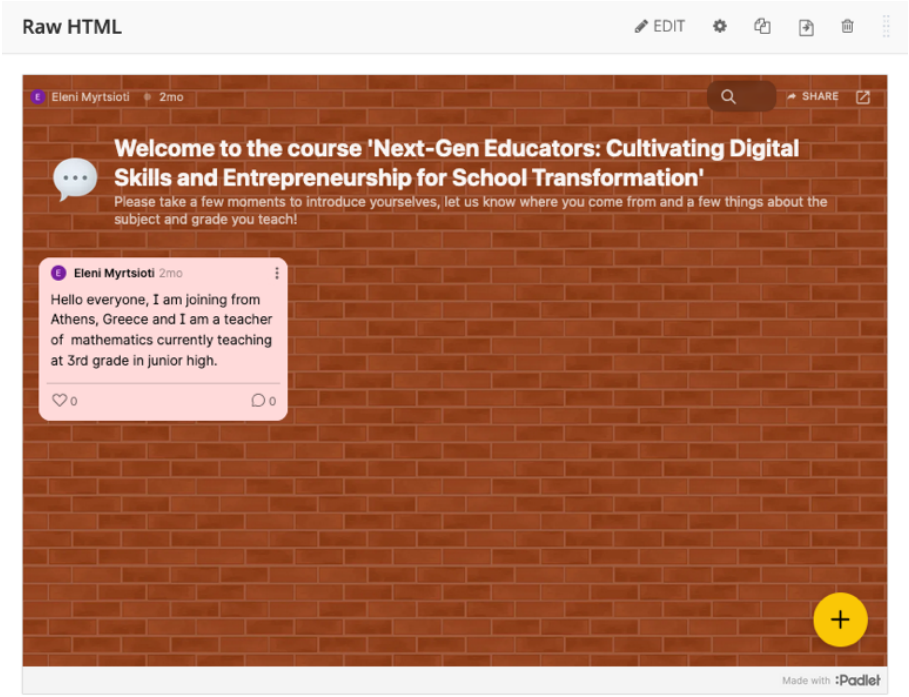


Figure 28: Padlet for the introduction activity

5.2.5 Evaluating the completeness of the course, the overall presentation of the required information and the learning activities

The evaluation of the general overview of the micro-MOOC reveals an overall well-structured and engaging course that effectively covers the selected learning outcomes and various topics about digital and entrepreneurial skills. The content is comprehensive, ensuring learners have a clear understanding of the objectives and materials.

However, a challenge has been noted in the units dedicated to Practice as a plethora of interactive elements might demotivate learners, even if they don't correspond to mandatory tasks. This was done however as already explained for retention reasons and also because the learners' level is indicated as B1 – Intermediate; therefore it was seen as necessary to expose them to many practical tasks. Overall, the selected structure and choice of content made the learning experience impactful compared to online courses based on theoretical knowledge with limited assessments and few hands-on tasks. Overall, the micro-MOOC series in promising and correspond to the real needs of the target group.

5.2.6 Best practices in academic ethics and conduct, updated reference list and existence of additional resources

We have diligently adhered to best practices in academic ethics and conduct by giving proper credit to all contributing authors and sources, citing them as needed throughout our work and the references section. Special thanks go to the department staff for their invaluable support and guidance, especially for creating the evaluation criteria rubric and the main table used for the course's outline. Although all materials that were taken from third-party applications (e.g., Canva) were listed and working URL and HTML codes were used, we also gave credit individually to the graphic designers whose creative contributions enhanced the presentation of our materials (detailed mention in the Annex). This collaborative effort reflects our commitment to maintaining academic integrity and acknowledging the contributions of others in our research and coursework.

5.3 Facilitating learners, grading, certificate requirements and etiquette

All the necessary information has been adjusted and modified to ensure learners know essential information about the beginning of a course, the learning outcomes, details on how to receive their certificate, how to properly and respectfully use the forum and prerequisites for this course.

Apart from the relevant information on the landing page and the introduction unit about important dates, prerequisites and the success rate needed in the exam to receive the certificate, learners receive email notifications with the highlights of each micro-MOOC before it begins (Figure 29).

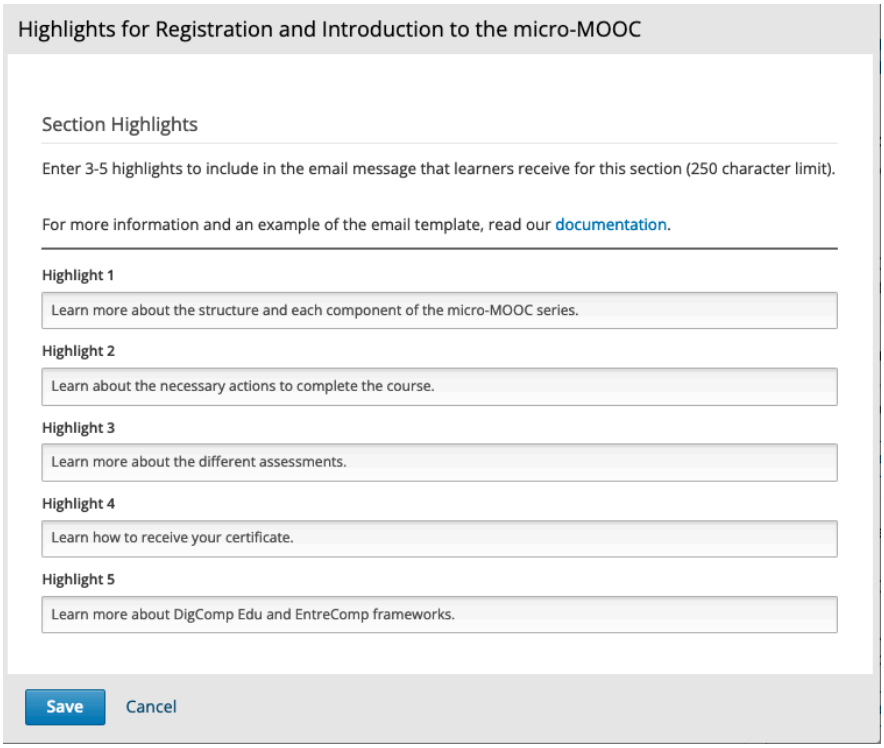


Figure 29: Micro-MOOC highlights received via email

In the present Chapter we provided a self-assessment following the creation of the course series attempting to cover all the evaluation criteria that can be found in Annex 3 (Mougiakou, 2024). The criteria have been merged in the subsections above as necessary.

CHAPTER 6: CONCLUSIONS AND SUGGESTIONS FOR FURTHER IMPROVEMENT

In Chapter 3 we reviewed some opportunities and challenges MOOCs present to those taking courses online with the objective to acquire new skills. According to Stracke (2017) open education and learning is a peculiar field as the products are not tangible; learning opportunities exist but the learning results greatly depend on the individuals, therefore quality can only be measured individually as well.

In his research Stracke debates that high drop-out rates for instance is not a reliable indicator, and indeed this is among the biggest challenges and main arguments on behalf of sceptics who do not endorse MOOCs in education (Sinha et al., 2014). Ultimately, he debates that there are three dimensions to consider while designing open courses: the objectives, the realization, and the achievements.

The future of education lies in a paradigm shift that reimagines MOOCs and open education. To truly empower learners, we must move beyond passive consumption and foster a culture of active engagement. Mentorship plays a pivotal role in this transformation, providing personalized guidance and support to prevent dropouts and cultivate a lifelong love of learning. By integrating mentorship into MOOCs, we can create a more inclusive and effective educational experience. We need for example to tackle each of the challenges identified in Chapter 3 but additional challenges too in a decisive way that extends beyond the superficial reasons behind dropouts or unsuccessful participation.

Mentorship in MOOCs and setting up a tutorial system through the discussion forum could be beneficial for learners as a whole but also for course coordinators who could detect any potential problems early on contributing also to the personalization of learning (Dhorne et al., 2017). Tutorial intervention is not something new; FutureLearn, an e-learning provider that typically adopts the social constructivist approach to education, has implemented a design that fosters conversational learning (Urrutia et al., 2015).

Furthermore, leveraging cutting-edge technologies like Artificial Intelligence (AI) can enhance personalized learning paths, offer real-time feedback, and create immersive learning environments that transcend geographical boundaries. This approach not only

equips learners with valuable skills but also instills in them a sense of citizenship and a desire to contribute positively to society. Fauvel et al. propose a taxonomy where AI research should focus on three aspects: learner modelling, improving learning experience and learner assessment.

Learner modelling would facilitate the understanding of learning outcomes by assessing learners' engagement, while it would contribute to creating better content such as videos to engage learners therefore improving learning experience. We saw earlier that even videos being an engaging feature overall, 48% of total engagement consists of learners playing the video only without engaging with pauses, notes taking or turning on the subtitles (Sinha et al., 2014). Lastly, AI can improve assessment not only by auto-grading but by merging data from peer-grading and tutor-grading providing to learners a more complete and constructive feedback (Fauvel et al., 2018).

This brings us to our next point which is adaptive, machine and personalized learning. Significant efforts need to be made and sophisticated technologies needs to be tested and improved, but data collection directly from the e-learning environment to analyze learners' behavior tracking their progress could take place (Daniel et al., 2015). This could contribute to identifying for example where learners struggle the most (assignments, peer assessment, other). In this case, the system could automatically adjust the difficulty level of the assignments for example to challenge learners appropriately. This is an example of personalization that is feasible as opposed to more complex possibilities such as creating entire learning units that are automatically assigned to learners.

This is an interesting prospect especially in the context of various tools that we have in the European Union such as the Self-reflection on Effective Learning by Fostering the use of Innovative Educational Technologies (SELFIE). This tool has a complete set of questions that assigns a competence level for digital skills to users; if used in the initial Modules of a MOOC it could determine for instance early on what type and which assessments or practical tests learners should engage with.

We mentioned previously that MOOCs and their use need to be perceived in a more holistic way extending beyond the formal learning and educational context, become relevant for

everyone and that includes emphasis on accessibility. First and foremost this implies better content creation and use of digital media and resources that are accessible to people with disabilities. Online education can be inclusive and ensure wellbeing through digital socialization, learning opportunities and employability (Iniesto et al., 2016; Bühler & Fisseler, 2007; Vila, Pallisera & Fullana, 2007). Iniesto et al. (2016) suggest that the changing attitudes and increasing awareness about disabilities increase the numbers of people declaring they have a disability with more of them gradually joining open courses online.

This is an opportunity for MOOC providers to initially see how they can improve the delivery of their courses making them more inclusive, and then for educators to contribute. This process would certainly include accessibility testing, organizational processes such as the use of data, guidelines and error reporting, however, it is also an opportunity to establish policies, international standardization for disabled users and potentially legislation (Iniesto et al., 2016).

On a more general note, the shift from traditional pedagogies to future-oriented pedagogies is essential for preparing learners to navigate the complexities and uncertainties of the modern world. The research by Bound et al. (2024) in the context of the *Future Oriented Pedagogies* study on behalf of the Institute for Adult Learning in Singapore, highlights the need for pedagogical approaches that foster learners' ability to engage with emergent, complex, and unfamiliar challenges.

Approaches such as Dynamic Generative Knowing (DGK) emphasize the importance of learner agency, critical evaluation, and collaborative problem-solving, moving beyond merely reproducing knowledge to actively generating and applying it in diverse contexts. By incorporating these pedagogical frameworks, educators can cultivate a learning environment that not only supports the acquisition of knowledge but also nurtures the skills and mindsets necessary for lifelong learning and adaptability. What we mean by that is that while we need to rethink and improve specific aspects of learning and assessment, a focus should be given to new learning models and pedagogies as well.

In her research, Bound et al. (2024) emphasize a lot on work-based learning; as a matter of fact this study was based on health care workers and their experiences with a MOOC.

Earlier on in the thesis we discussed how micro-learning facilitated the creation of a course on digital and entrepreneurial competencies, stepping on that in a discussion on how to improve MOOC delivery and learner response, we need to consider micro-credentials.

Massive Open Online Courses need to become relevant; this statement is simple yet it summarizes the key indicator for their success. More research and practical implementation of micro-credentials needs to take place in order to design high-quality credentials that reflect the acquisition of specific skills and qualifications (Galindo et al., 2024). We are rapidly moving towards portfolio-based hiring processes becoming the norm and digital repositories of learners' work are inclusive and very hard to dispute; they can include projects, papers, products and so on (Holtzman et al., 2022). The creation of short and targeted micro-courses leading to micro-credentials recognize their respective skills is something that e-learning providers need to consider and apply at large.

REFERENCES

Abrahams, M. (2023). How to Make a Compelling Pitch. *Harvard Business Review*. Retrieved August 15, 2024, from https://hbr.org/2023/08/how-to-make-a-compelling-pitch

Akoto, M. (2021). Collaborative Multimodal Writing via Google Docs: Perceptions of French FL Learners. *Languages*, 6, 140. https://doi.org/10.3390/languages6030140

Al-Atabi, M., & DeBoer, J. (2014). Teaching entrepreneurship using Massive Open Online Course (MOOC). *Technovation*, *34*(4), 261–264. https://doi.org/10.1016/j.technovation.2014.01.006

Bae, T. J., Qian, S., Miao, C., &Fiet, J. O. (2014). The Relationship Between Entrepreneurship Education and Entrepreneurial Intentions: A Meta-Analytic Review. *Entrepreneurship: Theory and Practice*, *38*(2), 217–254. Scopus. https://doi.org/10.1111/etap.12095

Bound, H. (2024). *Future Oriented Pedagogies – FOP Research Note 1*. Singapore: Institute for Adult Learning. Retrieved September 11, 2024, from https://www.ial.edu.sg/getmedia/25511c89-b3a5-4760-9cb2-ed78415814f7/Future-oriented-Pedagogies.pdf

Brunton, J., Brown, M., Costello, E., & Walsh, E. (2016). Designing and developing a programme-focused assessment strategy: A case study. *Open Learning: The Journal of Open, Distance and e-Learning*, *31*(2), 176–187. https://doi.org/10.1080/02680513.2016.1187593

Bühler, C. and Fisseler, B.(2007) Accessible e-learning and educational technology-extending learning opportunities for people with disabilities. *In Conference ICL2007*, September 26–28, 2007, pp. 11. Kassel University Press. https://hal.science/hal-00257138/

Cadotte, E. R. (2022). How to Use Simulation Games in the Classroom? *The Journal of Entrepreneurship*, *31*(2_suppl), S90–S134. https://doi.org/10.1177/09713557221107442

Castillo, N. M., Lee, J., Zahra, F. T., & Wagner, D. A. (2015a). MOOCs for Development: Trends, Challenges, and Opportunities. *Information Technologies & International Development*, *11*(2), Article 2. https://docs.edtechhub.org/lib/BN8SW2CU

Carpenter, J. P., Trust, T., & Green, T. D. (2020). Transformative instruction or old wine in new skins? Exploring how and why educators use HyperDocs. *Computers & Education*, *157*, 103979. https://doi.org/10.1016/j.compedu.2020.103979

Cz., J. H. (2016). Micro-content Generation Framework as a Learning Innovation. In A. Benedek& Á. Veszelszki (Eds.), *In the Beginning was the Image: The Omnipresence of Pictures* (pp. 171–180). Peter Lang AG. https://www.jstor.org/stable/j.ctv2t4cns.19

Dal, M., Elo, J., Leffler, E., Svedberg, G., & Westerberg, M. (2016). Research on pedagogical entrepreneurship – a literature review based on studies from Finland, Iceland and Sweden. *Education Inquiry*, *7*(2), 30036. https://doi.org/10.3402/edui.v7.30036

Daniel, J., Vázquez Cano, E., & Gisbert Cervera, M. (2015). The Future of MOOCs: Adaptive Learning or Business Model? *International Journal of Educational Technology in Higher Education*, *12*(1), Article 1. https://doi.org/10.7238/rusc.v12i1.2475

Deng, R. (2024). Effect of video styles on learner engagement in MOOCs. *Technology, Pedagogy and Education*, *33*(1), 1–21. https://doi.org/10.1080/1475939X.2023.2246981

Dhorne, L., Deflandre, J.-P., Bernaert, O., Bianchi, S., & Thirouard, M. (2017). Mentoring Learners in MOOCs: A New Way to Improve Completion Rates? In C. Delgado Kloos, P. Jermann, M. Pérez-Sanagustín, D. T. Seaton, & S. White (Eds.), *Digital Education: Out to the World and Back to the Campus* (pp. 29–37). Springer International Publishing. https://doi.org/10.1007/978-3-319-59044-8_4

Elias, M. (2019, November 14). *A Framework for Student Goal-Setting*. Edutopia. Retrieved August 14, 2024, from https://www.edutopia.org/article/framework-student-goal-setting/

Eltanahy, M., Forawi, S., & Mansour, N. (2020). Incorporating Entrepreneurial Practices into STEM Education: Development of Interdisciplinary E-STEM Model in High School in the United Arab Emirates. *Thinking Skills and Creativity*, *37*, 100697. https://doi.org/10.1016/j.tsc.2020.100697

Engeström, R., & Käyhkö, L. (2021). A critical search for the learning object across school and out-of-school contexts: A case of entrepreneurship education. *Journal of the Learning Sciences*, *30*(3), 401–432. https://doi.org/10.1080/10508406.2021.1908296

Eriksson, T., Adawi, T., & Stöhr, C. (2017). "Time is the bottleneck": A qualitative study exploring why learners drop out of MOOCs. *Journal of Computing in Higher Education*, *29*(1), 133–146. https://doi.org/10.1007/s12528-016-9127-8

European Commission: Joint Research Centre, Bacigalupo, M., Kampylis, P., Punie, Y., & Brande, G. (2016). *EntreComp : the entrepreneurship competence framework*, Publications Office. Retrieved July 11, 2024, from https://data.europa.eu/doi/10.2791/160811

European Commission: Joint Research Centre, Redecker, C., & Punie, Y. (2017). European framework for the digital competence of educators : DigCompEdu, (Y.Punie,edito) Publications Office. https://data.europa.eu/doi/10.2760/159770

European Commission (2023). entreTime project: Training on Teaching Entrepreneurship on EU Academy. Retrieved September 16, 2024, from https://eismea.ec.europa.eu/news/entretime-project-training-teaching-entrepreneurship-eu-academy-2023-02-21_en

European Commission (2023). *Teaching Entrepreneurship* [MOOC]. EU Academy. https://academy.europa.eu/courses/teaching-entrepreneurship/view/

Eurydice - European Education and Culture Executive Agency, Bourgeois, A., Balcon, M.-P., Riiheläinen, J. M., Antoine, A., Noorani, S., & Zagordo, M. (2016). *Entrepreneurship education at school in Europe: Eurydice report*. Publications Office of the European Union. Retrieved July 11, 2024, from https://data.europa.eu/doi/10.2797/301610

European Education and Culture Executive Agency, Eurydice, Bourgeois, A., Balcon, M., Riiheläinen, J. et al., (2016). *Entrepreneurship education at school in Europe – Eurydice report*, Publications Office of the European Union. Retrieved July 11, 2024, from https://data.europa.eu/doi/10.2797/301610

Fayolle, A., Gailly, B., & Lassas-Clerc, N. (2006). Assessing the impact of entrepreneurship education programmes: A new methodology. *Journal of European Industrial Training*, *30*(9), 701–720. Scopus. https://doi.org/10.1108/03090590610715022

Fauvel, S., Yu, H., Miao, C., Cui, L., Song, H., Zhang, L., Li, X., & Leung, C. (2018). Artificial Intelligence Powered MOOCs: A Brief Survey. *IEEE Computer Society*, 56–61. https://doi.org/10.1109/AGENTS.2018.8460059

Galikyan, I., Admiraal, W., & Kester, L. (2021). MOOC discussion forums: The interplay of the cognitive and the social. *Computers & Education*, *165*, 104133. https://doi.org/10.1016/j.compedu.2021.104133

Galindo, M., Fennelly-Atkinson, R., Franklin, K., Luna, C.(2024). The Role of Micro-Credentials in Lifelong Learning and Development: Empowering *Learners, Empowering Organizations*. Digital Promise. https://doi org/10 51388/20 500 12265/225

Gorka, S., Miller, J. R., & Howe, B. J. (2007). Developing realistic capstone projects in conjunction with industry. *Proceedings of the 8th ACM SIGITE Conference on Information Technology Education*, 27–32. https://doi.org/10.1145/1324302.1324309

Gulatee, Y., Nilsook, P. (2016). MOOC's Barriers and Enables. *International Journal of Information and Education Technology*, *6*(10), 826–830. https://doi.org/10.7763/IJIET.2016.V6.800

Gutiérrez-Solana Salcedo, F., González Calleja, A., Divjak, B., Svetec, B., Bađari, J., Carla Portela, Costa, P., Kuru, P., (2023). *E-Desk: Digital and Entrepreneurial Teachers for a Fast-Changing World* [MOOC]. *Learn@FOI.* https://learn.foi.hr/course/view.php?id=30

Haughey, D. (2014, December 13). *A Brief History of SMART Goals*. Project Smart. Retrieved August 5, 2024, from https://www.projectsmart.co.uk/smart-goals/brief-history-of-smart-goals.php

Hay, I. Bruce, B., Bennett, J. (2024) *Online education: The foundations of online teaching* [MOOC]. Coursera. https://www.coursera.org/learn/the-foundations-of-online-teaching?specialization=online-learning-design-educators

Hew, K. F., & Cheung, W. S. (2014). Students' and instructors' use of massive open online courses (MOOCs): Motivations and challenges. *Educational Research Review*, *12*, 45–58. https://doi.org/10.1016/j.edurev.2014.05.001

Höfler, E., Zimmermann, C., & Ebner, M. (2017). A case study on narrative structures in instructional MOOC designs. *Journal of Research in Innovative Teaching & Learning*, *10*(1), 48–62. https://doi.org/10.1108/JRIT-09-2016-0005

Holtzman, D. M., Kraft, E. M., & Small, E. (2022). Use of ePortfolios for making hiring decisions: A comparison of the results from representatives of large and small businesses. *Journal of Work-Applied Management*, *14*(1), 18–34. https://doi.org/10.1108/JWAM-01-2021-0001

Horozidis, G. (2024). *HyperMOOC* [MOOC]. https://hypermooc.gr

Iniesto, F., McAndrew, P., Minocha, S., & Coughlan, T. (2016). Accessibility of MOOCs: Understanding the Provider Perspective. *Journal of Interactive Media in Education*, *2016*(1). https://doi.org/10.5334/jime.430

Janowski, A., & Szczepańska – Przekota, A. (2024). Entrepreneurship education in Poland: Contemporary problems and future opportunities. *The International Journal of Management Education*, *22*(1), 100931. https://doi.org/10.1016/j.ijme.2024.100931

Jin, K., Li, H., Yang, L., & Song, Q. (2014). Introducing Entrepreneurship Thinking into STEM Curriculum through Hands-on Projects. *Conference Proceedings. New Perspectives in Science Education 2014*. https://conference.pixel-online.net/library_scheda.php?id_abs=118

Jivet, I., Wong, J., Scheffel, M., Valle Torre, M., Specht, M., & Drachsler, H. (2021). Quantum of Choice: How learners' feedback monitoring decisions, goals and self-regulated learning skills are related. *LAK21: 11th International Learning Analytics and Knowledge Conference*, 416–427. https://doi.org/10.1145/3448139.3448179

Joint Research Centre: Institute for Prospective Technological Studies, Devine, J., Punie, Y., & Kampylis, P. (2015). *Promoting effective digital-age learning : a European framework for digitally-competent educational organisations*, Publications Office. Retrieved July 06, 2024, from https://data.europa.eu/doi/10.2791/54070

Jung, Y., & Lee, J. (2018). Learning Engagement and Persistence in Massive Open Online Courses (MOOCS). *Computers & Education*, *122*, 9–22. https://doi.org/10.1016/j.compedu.2018.02.013

Kellogg, S., Booth, S., & Oliver, K. (2014). A Social Network Perspective on Peer Supported Learning in MOOCs for Educators. *International Review of Research in Open and Distributed Learning*, *15*(5), 263–289. https://doi.org/10.19173/irrodl.v15i5.1852

Kolb, L. (2021, June 29). *How HyperDocs Can Make Schoolwork More Student Friendly*. Edutopia. https://www.edutopia.org/article/how-hyperdocs-can-make-schoolwork-more-student-friendly/ Retrieved August 13, 2024, from https://www.edutopia.org/article/how-hyperdocs-can-make-schoolwork-more-student-friendly/

Lackner, E., Kopp, M. and Ebner, M. (2014), "How to MOOC? – a pedagogical guideline for practitioners", in Roceanu, I. (Ed.), *Proceedings of the 10th International Scientific Conference "eLearning and Software for Education", Editura Universitatii Nationale de Aparare "Carol I"*, Bucharest, pp. 215-222. Retrieved September 11, 2024, from https://www.researchgate.net/profile/Martin-Ebner-3/publication/261949012_How_to_MOOC_-_A_pedagogical_guideline_for_practitioners/links/0c960535fe82fcc423000000/How-to-MOOC-A-pedagogical-guideline-for-practitioners.pdf

Laurillard, D. (2013). Rethinking university teaching: A conversational framework for the effective use of learning technologies. *Routledge*. https://www.taylorfrancis.com/books/mono/10.4324/9780203160329/rethinking-university-teaching-diana-laurillard

Leong, K., Sung, A., Au, D., & Blanchard, C. (2021). A review of the trend of microlearning. *Journal of Work-Applied Management*, *13*(1), 88–102. https://doi.org/10.1108/JWAM-10-2020-0044

Liyanagunawardena, T. R. (2014). MOOC experience: A participant's reflection. *SIGCAS Comput. Soc.*, *44*(1), 9–14. https://doi.org/10.1145/2602147.2602149

Lowenthal, P. R., & Hodges, C. B. (2015). In Search of Quality: Using Quality Matters to Analyze the Quality of Massive, Open, Online Courses (MOOCs). *International Review of Research in Open and Distributed Learning*, 16(5), 83–101. https://doi.org/10.19173/irrodl.v16i5.2348

Lv, M., Liu, H., Zhou, W., & Zheng, C. (2020). Efficiency model of micro-course study based on cognitive psychology in the college. *Computers in Human Behavior*, *107*, 106027. https://doi.org/10.1016/j.chb.2019.05.024

Μπακοπούλου, Μ. (2023, May 31). *LG Electronics Hellas: Η εταιρεία που συμμετέχει στο πρόγραμμα παράδοσης 36.000 ψηφιακών πινάκων στα σχολεία - Το επόμενο βήμα με τα ρομπότ - BusinessNews.gr*. Retrieved July 14, 2024, from https://www.businessnews.gr/epixeiriseis/item/264931-lg-electronics-hellas-to-mega-deal-stin-ekpaidefsi-me-tous-36-000-psifiakoys-pinakes-kai-to-epomeno-vima-me-ta-rompot

Mercer, N., Hennessy, S., & Warwick, P. (2010). Using interactive whiteboards to orchestrate classroom dialogue. *Technology, Pedagogy and Education*, *19*(2), 195–209. https://doi.org/10.1080/1475939X.2010.491230

Mougiakou, S. (2024). *Educational Technology Syllabus* [Course assignments]. pp. 12-13.University of Piraeus, Piraeus. Retrieved July 03, 2024, from https://lefkippos.ds.unipi.gr/courses/ELEARN112/

Northcote, M., Mildenhall, P., Marshall, L., & Swan, P. (2010). Interactive whiteboards: Interactive or just whiteboards? *Australasian Journal of Educational Technology*, 26(4), Article 4. https://doi.org/10.14742/ajet.1067

Ortega-Arranz, A., Bote-Lorenzo, M. L., Asensio-Pérez, J. I., Martínez-Monés, A., Gómez-Sánchez, E., & Dimitriadis, Y. (2019). To reward and beyond: Analyzing the effect of reward-based strategies in a MOOC. *Computers & Education*, *142*, 103639. https://doi.org/10.1016/j.compedu.2019.103639

Ramírez-Montoya, M.-S., Mena, J., & Rodríguez-Arroyo, J. A. (2017). In-service teachers' self-perceptions of digital competence and OER use as determined by a xMOOC training course. *Computers in Human Behavior*, *77*, 356–364. https://doi.org/10.1016/j.chb.2017.09.010

Redford, D. (2024). *Teach like an Entrepreneur* [MOOC]. FutureLearn. https://www.futurelearn.com/courses/teach-like-an-entrepreneur-bringing-entrepreneurship-into-the-classroom/1

Resei, C., Friedl, C., & Żur, A. (2018). MOOCs and entrepreneurship education-contributions, opportunities and gaps. *International Entrepreneurship Review*, *4*(3), 151. https://ier.uek.krakow.pl/index.php/pm/article/view/1764

Rivera, N., & Ramirez, M.S. (2015). Digital skills development: MOOC as a tool for teacher training. Proceedings from International Conference of Education, Research, and Innovation (ICERI2015), Seville, Spain. Retrieved September 11, 2024, from https://www.irrodl.org/index.php/irrodl/article/view/3489/4767

Rof, A., Bikfalvi, A., & Marques, P. (2024). Exploring learner satisfaction and the effectiveness of microlearning in higher education. *The Internet and Higher Education*, *62*, 100952. https://doi.org/10.1016/j.iheduc.2024.100952

Sankaranarayanan, R., Leung, J., Abramenka-Lachheb, V., Seo, G., & Lachheb, A. (2023). Microlearning in Diverse Contexts: A Bibliometric Analysis. *TechTrends*, *67*(2), 260–276. https://doi.org/10.1007/s11528-022-00794-x

Shanley, D., Swierstra, T., & Wyatt, S. (2020). Bildung in a Digital World: The Case of MOOCs. In M. Stocchetti (Ed.), *The Digital Age and Its Discontents* (pp. 211–234). Helsinki University Press. https://doi.org/10.2307/j.ctv16c9hdw.15

Shatto, B. (2024). *Instructional Design: Digital Media, New Tools and Technology* [MOOC]. EdX. https://learning.edx.org/course/course-v1:USMx+LDT300x+2T2024/home

Sitaridis, I., & Kitsios, F. (2024). Digital entrepreneurship and entrepreneurship education: A review of the literature. *International Journal of Entrepreneurial Behavior & Research*, *30*(2/3), 277–304. https://doi.org/10.1108/IJEBR-01-2023-0053

Stöhr, C., Stathakarou, N., Mueller, F., Nifakos, S., & McGrath, C. (2019). Videos as learning objects in MOOCs: A study of specialist and non-specialist participants' video activity in MOOCs. *British Journal of Educational Technology*, *50*(1), 166–176. https://doi.org/10.1111/bjet.12623

Stracke, C. M. (2017). The Quality of MOOCs: How to Improve the Design of Open Education and Online Courses for Learners? In P. Zaphiris & A. Ioannou (Eds.), *Learning and Collaboration Technologies. Novel Learning Ecosystems* (pp. 285–293). Springer International Publishing. https://doi.org/10.1007/978-3-319-58509-3_23

Stracke, C. M., & Trisolini, G. (2021). A Systematic Literature Review on the Quality of MOOCs. *Sustainability*, *13*(11), Article 11. https://doi.org/10.3390/su13115817

Suresh, K., & Srinivasan, P. (2020). Massive Open Online Courses – Anyone Can Access Anywhere at Anytime. *Shanlax International Journal of Education*, *8*(3), Article 3. https://doi.org/10.34293/education.v8i3.2458

Tang, H. (2021). Teaching teachers to use technology through massive open online course: Perspectives of interaction equivalency. *Computers & Education*, *174*, 104307. https://doi.org/10.1016/j.compedu.2021.104307

Thi Ngoc Ha, N., Van Dyke, N., Spittle, M., Watt, A., & Smallridge, A. (2024). Micro-credentials through the eyes of employers: Benefits, challenges and enablers of effectiveness. *Education + Training*, *ahead-of-print*(ahead-of-print). https://doi.org/10.1108/ET-08-2023-0340

Urrutia, M. L., White, S., Dickens, K., & White, S. (2015). *Mentoring at scale: MOOC mentor interventions towards a connected learning community*. Retrieved September 03, 2024, from https://eprints.soton.ac.uk/373982/2/Mentoring%2520at%2520Scale%2520final.pdf

Vila, M, Pallisera, M and Fullana, J. (2007). Work integration of people with disabilities in the regular labour market: What can we do to improve these processes? *Journal of Intellectual and Developmental Disability*. 32(1), pp. 10–18. DOI: http://dx.doi.org/10.1080/13668250701196807

Vuorikari, R., Kluzer, S., & Punie, Y. (2022). *DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes*. JRC Publications Repository. Retrieved July 03, 2024, from https://doi.org/10.2760/115376

Wang, W., Zhao, Y., Wu, Y. J., & Goh, M. (2023). Factors of dropout from MOOCs: A bibliometric review. *Library Hi Tech*, *41*(2), 432–453. https://doi.org/10.1108/LHT-06-2022-0306

Zhu, M. (2022). Designing and delivering MOOCs to motivate participants for self-directed learning. *Open Learning: The Journal of Open, Distance and e-Learning*, *0*(0), 1–20. https://doi.org/10.1080/02680513.2022.2026213

ANNEXES

Annex 1: General information about the course

1. General information for this micro-MOOC

1.1. Title and links

Next-Gen Educators: Cultivating Digital Skills and Entrepreneurship for School Transformation

URL on Studio: https://studio.edunext.co/course/course-v1:next-gen-educators+NGE2024+2024-Autumn

URL (published): https://next-gen-educators.edunext.io/courses/course-v1:next-gen-educators+NGE2024+2024-Autumn/course/

1.2. Short description

This MOOC is divided into four micro-MOOCs, focusing on building essential digital competencies and fostering entrepreneurship skills. The first two micro-MOOCs equip learners with the necessary skills to navigate the fast-changing landscape of digital teaching, including understanding interactive whiteboards, creating e-portfolios, designing assessments, and giving effective feedback using digital tools. The final two micro-MOOCs shift focus to entrepreneurship, guiding learners in utilizing tangible resources, team building and coordination, action planning, designing goal-oriented activities, and identifying opportunities. By the end of the course, learners will be equipped to innovate in their teaching practice and coordinate entrepreneurial projects at school level. Digital competencies and entrepreneurship aren't independent from each other; a digitally competent teacher can enable their students explore their ideas and potential to the fullest, while entrepreneurial activities strongly rely on the use of digital tools and communication methods. The main purpose of this introductory micro-MOOC is to equip participants with the basic knowledge that will help them experiment in the context of their practice, try new tools and methods and eventually encourage them to delve into these topics thoroughly in the future.

2. Duration

The duration of the course is **14 hours,** and it can be completed in **4-5 days**.

3. Learning objectives for this course

The content of the course has been designed in such a way to introduce course participants to the European Framework for the Digital Competencies of Educators (Micro-MOOCs 1 and 2), and EntreComp: The Entrepreneurship Competence Framework (Micro-MOOCs 3 and 4).

The key competence areas and the learning objectives are outlined below:

European Framework for the Digital Competencies of Educators (DigCompEdu)
Micro-MOOCs 1 and 2
Level B1 – Integrator
Key Area 3 Teaching and Learning:

[3.1 Teaching]

1. I can understand the characteristics and skills needed for digital teaching

[3.3 Collaborative learning]

2. I can understand why interactive whiteboards can improve the teaching and learning process, and their impact on collaborative learning

Key Area 4 Assessment:

[4.1 Assessment strategies]

3. I can design and implement effective assessment strategies for digital learning environments

[4.3 Feedback and planning]

4. I can give feedback using digital tools and multimodality engaging my students in the process

EntreComp: The Entrepreneurship Competence Framework
Micro-MOOCs 3 and 4
Level 3 - Experiment
Key Area 2 Resources:

[2.3 Mobilizing resources]

5. I can evaluate and utilize different resources at my disposal to maximize their impact

[2.5 Mobilizing others]

6. I can form and coordinate a team ensuring that everyone works collaboratively towards a common entrepreneurship project

Key Area 3 Into Action:

[3.2 Planning and management]

7. I can design activities that serve short term and long-term goals creating action plans

Key Area 1 Ideas and Opportunities

[1.1 Spotting opportunities]

8. I can spot opportunities and design appropriate activities that connect with social and economic needs

4. Self-evaluation and assessment

Assessment-Type-1: [Self-assessment with the use of the Open Response Assessment (ORA) function]. Participants evaluate their responses based on the rubrics available for each question. Open Response Assessment has been used four times in the third and last Unit of each micro-MOOC 'Recap and Self-Assessment'. Learners are typically asked to write a brief report of approximately 400 words to evaluate their knowledge about digital skills and skills to bring entrepreneurship at their school. ORA concerns the following activities: Act_ID#2.3.2, Act_ID#3.3.2, Act_ID#4.3.2 και Act_ID#5.3.2.

Assessment-Type-2: [Self-assessment – Many types of assessment have been chosen for the evaluation of participants such as drop-down problem, poll, Multiple Choice Questions (MCQs)]

1.4.1 [Poll] Participants respond to three brief polls in the introductory unit to evaluate their initial knowledge on the learning outcomes of the Micro-MOOCs. The application Quizizz was used for this poll.

1.4.2 [Problem with Adaptive Hint] Very brief assessment containing one question to fill in the gap.

2.0.1 [Poll] Participants respond to four brief polls in order to evaluate their overall knowledge and beliefs for learning outcomes one and two. Google Forms has been used for this poll.

2.1.3 [Image Mapped Input] Participants respond to three questions by demonstrating their understanding of the content we examined in the previous demonstration Unit of micro-MOOC 1. Considering this is one of the first evaluations, participants have access to the 'Show Answer' button after one attempt to avoid demotivating them.

2.1.4 [Dropdown problem with Hints and Feedback] Participants work on two self-evaluation scenarios to evaluate their understanding and critical thinking concerning the materials of the first Unit of micro-MOOC 1. The integrated function of Dropdown problem is used with hints to facilitate learners. The theory of Behaviorism is examined in the scenarios. Participants have access to all three hints as a form of assistance and can access the 'Show Answer' button after 2 attempts.

2.2.3 [Multiple choice quiz – Various modes] Participants respond to a few multiple-choice questions to evaluate their knowledge, attitudes and beliefs for the content we examined in the second Unit of micro-MOOC 1. The quiz has been created on Quizlet and can be taken in various study modes such as a flashcards memory game, test, matching game and repeat in writing for comprehension and memory exercise.

2.2.4 [Dropdown problem with Hints and Feedback] Participants work on two self-evaluation scenarios to evaluate their understanding and critical thinking concerning the materials of the second Unit of micro-MOOC 1. The integrated function of Dropdown problem is used with hints to facilitate learners. Constructivism and Bloom's Taxonomy are examined in the scenarios. Participants have access to all three hints as a form of assistance and can access the 'Show Answer' button after 2 attempts.

2.3.3 [Checklist Self-evaluation, Poll and Word-cloud, Progress Bar] Three short polls are given to assess participants' knowledge of micro-MOOC 1 and a Word cloud to record what impressed them most. The integrated Poll feature and Quizizz were used, respectively.

3.0.1 [Poll]Participants respond to four brief polls in order to evaluate their overall knowledge and beliefs for learning outcomes three and four. Google Forms has been used for this poll.

3.1.3 [Multiple choice quiz] Participants respond to three brief multiple-choice questions to evaluate their knowledge, attitudes and beliefs for the content we examined in the first Unit of micro-MOOC 2.The quiz has been created on Quizlet and is meant to be taken as a multiple-choice quiz.

3.1.4 [Dropdown problem - Self-evaluation] Participants work on two self-evaluation scenarios to evaluate their understanding and critical thinking concerning the materials of the first Unit of micro-MOOC 2. Participants have access to all three hints as a form of assistance and can access the 'Show Answer' button after 2 attempts.

3.2.3 [Match and Answer quiz] Participants respond to three brief multiple-choice questions to evaluate their knowledge, attitudes and beliefs for the content we examined in the second Unit of micro-MOOC 2. The quiz has been created on Quizlet and is meant to be taken as a Match and Answer game.

3.2.4 [Dropdown problem - Self-evaluation] Participants work on two self-evaluation scenarios to evaluate their understanding and critical thinking concerning the materials of the second Unit of micro-MOOC 2. Participants have access to all three hints as a form of assistance and can access the 'Show Answer' button after 2 attempts.

3.3.3 [Checklist Self-evaluation, Poll and Word-cloud, Progress Bar] Three short polls are given to assess participants' knowledge of micro-MOOC 2 and a Word cloud to record what impressed them most. The integrated Poll feature and Quizizz were used, respectively.

4.0.1 [Poll] Participants respond to four brief polls in order to evaluate their overall knowledge and beliefs for learning outcomes five and six. Google Forms has been used for this poll.

4.1.3 [Multiple choice quiz - Flashcards learning mode] Participants respond to a match-the-sentences game with four statements to evaluate their knowledge, attitudes and beliefs for the content we examined in the first Unit of micro-MOOC 3. The quiz has been created on Quizlet and in lieu of the usual hint, an interactive map with more hints has been provided.

4.1.4 [Dropdown problem with Hints and Feedback] Participants work on two self-evaluation scenarios to evaluate their understanding and critical thinking concerning the materials of the first Unit of micro-MOOC 3. The integrated function of Dropdown problem is used with hints to facilitate learners. The learning theory of Connectivism was examined in the scenarios. Participants have access to all three hints as a form of assistance and can access the 'Show Answer' button after 2 attempts.

4.2.3 [Match and Answer quiz] Participants match six statements with their respective interpretation to evaluate their knowledge of pitching principles examined in the second Unit of micro-MOOC 3, and De Bono's Six Thinking Hats theory.

4.2.4 [Dropdown problem - Self-evaluation] Participants work on two self-evaluation scenarios to evaluate their understanding and critical thinking concerning the materials of the second Unit of micro-MOOC 3. The integrated function of Dropdown problem is used with hints to facilitate learners. The teaching method of Problem-Based Learning was examined in the scenarios. Participants have access to all three hints as a form of assistance and can access the 'Show Answer' button after 2 attempts.

4.3.3 [Checklist Self-evaluation, Poll and Word-cloud, Progress Bar] Three short polls are given to assess participants' knowledge of micro-MOOC 2 and a Word cloud to record what impressed them most. The integrated Poll feature and Quizizz were used, respectively.

5.0.1 [Poll] Participants respond to four brief polls in order to evaluate their overall knowledge and beliefs for learning outcomes seven and eight. Google Forms has been used for this poll.

5.1.3 [Multiple choice quiz] Participants respond to three brief multiple-choice questions to evaluate their knowledge, attitudes and beliefs for the content we examined in the first Unit of micro-MOOC 4. The quiz has been created on Quizlet.

5.1.4 [Dropdown problem - Self-evaluation] Participants work on two self-evaluation scenarios to evaluate their understanding and critical thinking concerning the materials of

the first Unit of micro-MOOC 4. The integrated function of Dropdown problem is used with hints to facilitate learners. The teaching method of Project-Based Learning was examined in the scenarios. Participants have access to all three hints as a form of assistance and can access the 'Show Answer' button after 2 attempts.

5.2.3 [Match and Answer quiz] Participants respond to three brief multiple-choice questions to evaluate their knowledge, attitudes and beliefs for the content we examined in the second Unit of micro-MOOC 4. The quiz has been created on Quizlet.

5.2.4 [Dropdown problem - Self-evaluation] Participants work on two self-evaluation scenarios to evaluate their understanding and critical thinking concerning the materials of the second Unit of micro-MOOC 4. The integrated function of Dropdown problem is used with hints to facilitate learners. The teaching method of Project-Based Learning was examined in the scenarios. Participants have access to all three hints as a form of assistance and can access the 'Show Answer' button after 2 attempts.

5.3.3 [Checklist Self-evaluation, Poll and Word-cloud, Progress Bar] Three short polls are given to assess participants' knowledge of micro-MOOC 2 and a Word cloud to record what impressed them most. The integrated Poll feature and Quizizz were used, respectively.

Assessment-Type-3: [Final evaluation] 40 Multiple Choice Questions (MCQs) using the Dropdown feature. The questions are based on practical activities and topics we examined in the four micro-MOOCs. When it comes to the structure and themes of this questionnaire, for each group of five questions the first three have the objective to evaluate the understanding, critical awareness, attitudes and competencies of the participants, while the last two are examining participants' understanding for instructional strategies and pedagogical methods.

The main objective of the final examination is for participants to think critically and be in a position to apply this knowledge later on in their classroom and not to memorize the content used in the presentation, the videos or the course in itself. Five questions correspond to each one of the Learning Objectives. It can be found in the unit 6.1, Activity 6.1.1.

5. Prerequisite knowledge and competencies

The standard level of competence for all activities has been defined as B1 Integrator and Experiment reflecting DigCompEdu and EntreComp respectively. It means that participants can understand and create solutions for basic, clearly defined but not familiar to them problems in the selected topics. Consequently, course participants are expected to have some independence and basic competencies already.

Micro-MOOC 1

Essential

- Familiarity with using computers, navigating the Internet and various resource repositories in addition to basic applications like word processors.
- Basic understanding of education concepts like classroom management principles, student engagement techniques.

Desirable

- Comfort with accessing and using Learning Management Systems (LMS).

Micro-MOOC 2

Essential

- Ability to provide constructive feedback using the appropriate tone and content.
- Ability to facilitate assessment activities.

Desirable

- Using rubrics, criteria and designing questions that encourage critical thinking.

Micro-MOOC 3

Essential

- Previous experience working in teams.
- Ability to understand standard project management processes such as communication, presentation and pitching.

Desirable

- Financial literacy and basic understanding of resource planning.
- Ability to form and maintain relationship networks.
- Understanding of what social entrepreneurship is.

Micro-MOOC 4

Essential

- Ability to understand what an action plan is.

Desirable

- Previous experience in participating to student campaigns and competitions.

6. Graphical representation of the micro-MOOC

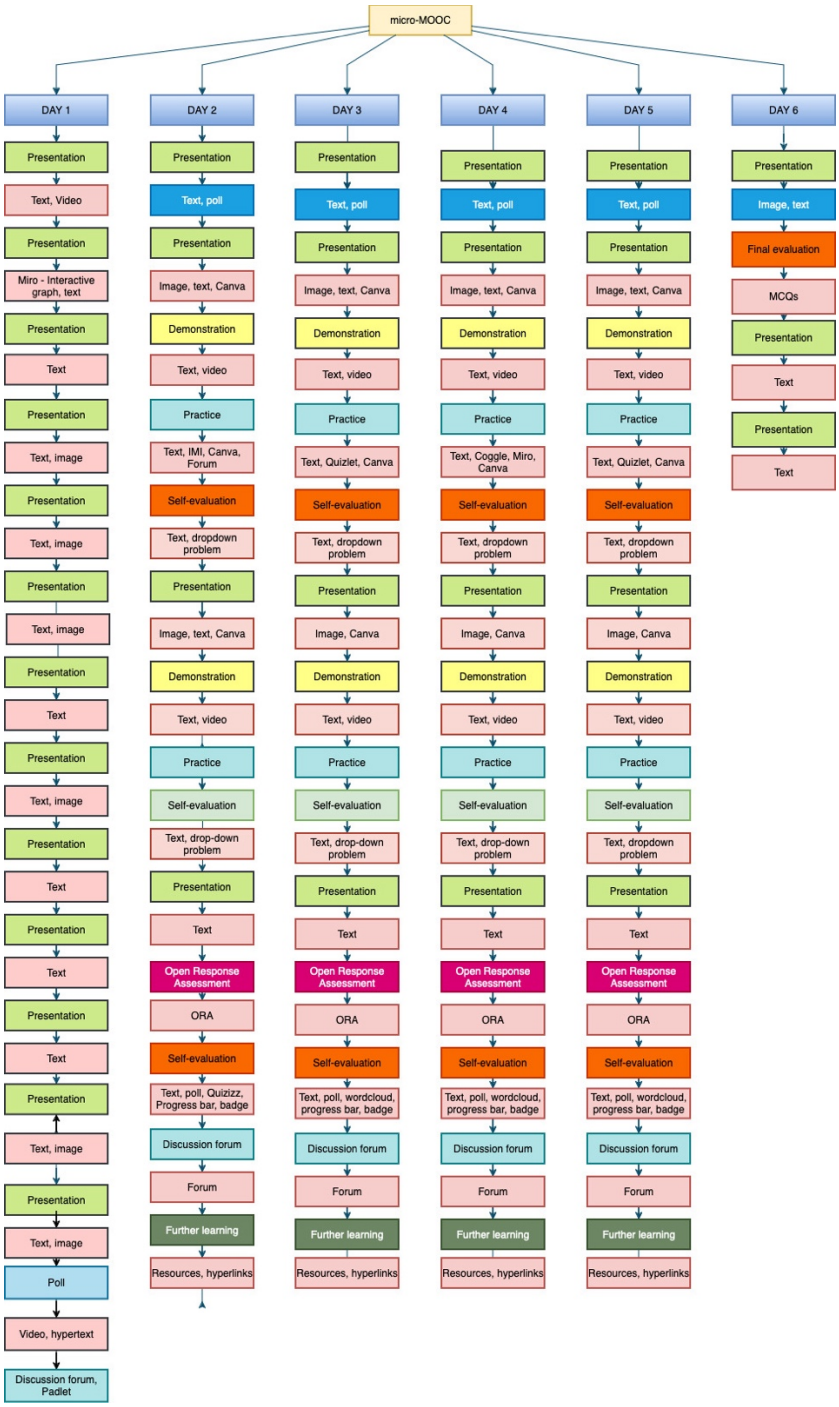


Figure 30: Graphical representation of the course[10]

[10] The tool graph was created by the author on draw.io and is available at: https://app.diagrams.net/#G1SWo6vm4aLnUlMR1zvl-OpZNEr_pnC6t7#%7B%22pageId%22%3A%22hKgyUjEwmqydRuCoXCjR%22%7D

7. Landing page

Welcome to the MOOC "Next-Gen Educators: Cultivating Digital Skills and Entrepreneurship for School Transformation"!

We are excited to have you join this transformative course designed specifically for secondary school teachers and Learning and Development professionals working at schools. In today's rapidly evolving world, digital skills and entrepreneurship are essential for preparing students for future careers and fostering an adaptable, innovative mindset. Throughout this 14-hour course, which you can complete in just 4-5 days, you will explore the *DigCompEdu* and *EntreComp* frameworks which will help you identify and develop key competencies. By understanding these competencies, you can design impactful lessons and educational materials that resonate with today's digital-native students.

A significant focus of this MOOC is the exploration and use of digital tools and applications. You will engage with a variety of resources, including videos, interactive exercises, forum discussions, and polls, all aimed at enhancing your digital pedagogy and classroom transformation. Additionally, our dedicated micro-MOOCs on digital skills and entrepreneurship will provide you with hands-on activities to create value through resources and people, and to assess and plan entrepreneurial opportunities within your school.

Digital skills and entrepreneurship are more important than ever as they align with career education, ensuring students are equipped to thrive in a fast-changing job market. Whether you are a seasoned educator or new to these concepts, this course is designed to be accessible and engaging. Embrace the opportunity to learn, apply your knowledge, and collaborate with your peers. Ask questions, share insights, and take full advantage of the discussions to enrich your learning experience.

Let's embark on this journey together to transform education and empower our students for the future!

Annex 2: Full content of the micro-MOOCs

Next-Gen Educators: Cultivating Digital Skills and Entrepreneurship for School Transformation

Day 1: Enrollment and registration (1 hour)

1.1 About this course

Act_ID#1.1.1 Welcome [Hypertext, Video]

[Hypertext]

Welcome to the MOOC **''Next-Gen Educators: Cultivating Digital Skills and Entrepreneurship for School Transformation''**! This course was created primarily for secondary school teachers, but also for every Learning and Development professional working at secondary schools who wishes to learn more about the DigCompEdu and EntreComp frameworks and how they can assist you understand which competencies can be used while designing your own lessons and educational material.

This course is focusing on key areas and their respective competencies. More specifically, key areas (3) Teaching and Learning, and (4) Assessment have been considered from DigCompEdu. When it comes to EntreComp, key areas (1) Ideas and Opportunities, (2) Resources, and (3) Into action have been equally used during the development of the course.

This course has dedicated two micro-MOOCs for digital skills and entrepreneurship equally, and relevant activities that highlight these topics have been developed. The materials and activities include a variety of resources such as videos, interactive exercises, forum discussions, polls and various assessment methods. While the expected competency level will be discussed in the next Unit, please be aware that knowledge, direct experience and personal interest on these skills may vary; this should in no way prevent you from participating, interacting and discussing with your peers, or ask questions!

We are here to support you along the way, have a look in the introductory video we have prepared below!

[Video]

Figure 31: Introduction video of the micro-MOOCs

The video was created by the author using the tool VidNoz AI, is available at: https://youtu.be/K36Dc6qogCY (1:46). The video is licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives license.

[End_of_Page]

Act_ID#1.1.2 Introduction, Competence level and Aim [Hypertext and interactive graph] [Interactive graph]

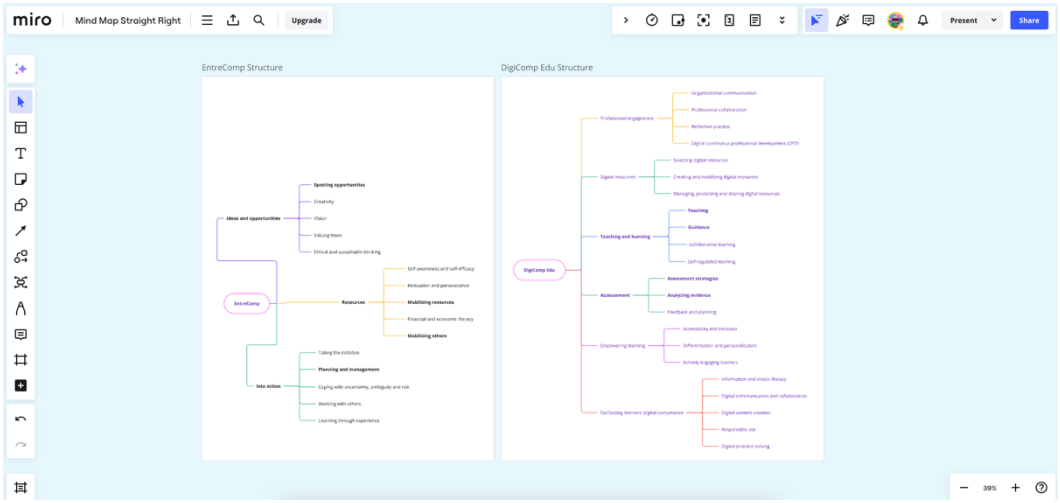


Figure 32: Diagram presenting the key competencies used in this course[11]

[Hypertext]

This course has been based on two very important Frameworks, and the real focus lies in the ability to use them as a prompt to create activities, materials and events in these areas. Every educator acknowledges why digital skills are important for teachers and learners, less attention is given on entrepreneurship and fostering the necessary skills to students as future citizens. However, the two complement each other very well, which is why this MOOC aspires to use them equally.

The expected competence level for participants concerning digital skills, and as defined by DigCompEdu, is B1 – Integration. Consequently, users are expected to integrate and make meaningful use of the suggested activities, ideas and materials diversifying them as needed when possible. Likewise, the expected competence level of participants concerning the materials presented in the last two Micro-MOOCs about entrepreneurship, is Intermediate Level 3 – Experiment. Participants are expected to spot an opportunity, explain why this would be of value, experiment with resources and provide evidence to support other team members. They are also able to create an action plan and set goals for the future.

Both frameworks are quite extensive, in the diagrams used above we provide detailed outlines for both, highlighting which core skills this MOOC focuses on. This is for school educators and staff wishing to take a serious step towards transforming their practice and consequently overall school competence. Therefore, we examine topics about teaching and learning, assessment, analyzing evidence from learner outcomes, and how the use of digital tools will enhance their skills while fulfilling tasks related to these.

In addition, they will learn why the use of resources and effective team building are a first solid step towards registering the notion of entrepreneurship in their students, and how spotting opportunities in our everyday life can be translated into innovating education material design.

[End_of_Page]

[11] Original design by Miro and adapted by the author, and is available at https://miro.com/app/board/uXjVKuObPEA=/

Act_ID#1.1.3 Learning outcomes [Hypertext]

[Hypertext]

Following the successful attendance of this MOOC, learners will be able to understand and implement basic strategies to accelerate their school's transformation, implementing new strategies that enhance students' digital and entrepreneurial skills. Learners will be familiar with important EU Frameworks, and they will be able to design materials and lessons with a satisfactory degree of independence. More specifically, they will be able to:

1. Understand the characteristics and skills needed for digital teaching.
2. Understand why interactive whiteboards can improve teaching and learning as processes and what is their impact on collaborative learning.
3. Design and implement effective assessment strategies for digital learning environments.
4. Give feedback using digital tools and multimodality.
5. Evaluate and utilize different resources at their disposal to maximize their impact.
6. Form and coordinate a team ensuring that everyone to work collaboratively towards a common entrepreneurship project.
7. Design ana action plan and activities that serve short term and long-term goals.
8. Spot opportunities to design appropriate activities that reason with social and economic needs.

[End_of_Page]

Act_ID#1.1.4 Micro-MOOC structure [Image and Hypertext]

[Image]

Figure 33: Author's collage with visuals created for the purposes of multiple units

[Hypertext]

The course has a total duration of 14 hours and can be completed in 5-6 days, and consists of the following parts:

- Registration and Introduction to the micro-MOOC
- Micro-MOOC 1 – Digital education and class transformation
- Micro-MOOC 2 –Assessment and feedback for the modern school
- Micro-MOOC 3 – Creating value through resources and people
- Micro-MOOC 4 – Enhancing school entrepreneurship through opportunity assessment and planning
- Course evaluation

<u>Every Micro-MOOC has the following parts:</u>

- Introduction (10')
- Two sub-units of a total duration of 1 hour each. Each sub-unit consists of:
    - Presentation activity (15')
    - Demonstration activity (15')
    - Practice activity (15')

- Self-assessment activity (15')

- Recap that includes (50'):
  - Summary of the Micro-MOOC (5')
  - Open Response Assignment application work that learners self-assess with the help of a rubric (30')
  - Checklist for achieving learning outcomes in the form of a Poll(5')
  - Discussion Forum (10')

[End_of_Page]

Act_ID#1.1.5 **License [Hypertext and Image]**

[Image]

Figure 34: Creative Commons (CC) license logo

This course is licensed to **Attribution-NonCommercial-NoDerivatives license or "BY-NC-ND"**

[Hypertext]

This course is licensed to **Attribution-NonCommercial-NoDerivatives license or "BY-NC-ND".** This is the most restrictive license offered by CC. It allows people to use the unadopted work for noncommercial purposes only, and only as long as they give credit to the creator. They may also adapt the work for their own personal use but may not share any adaptations publicly (source: Creative Commons Certificates Descriptions).

This course is part of a micro-credentials series of additional courses that will follow, currently in development. For this reason, while we encourage you to take inspiration and ideas from the materials, we prohibit further sharing and use. It is very important for us to see how learners interact with the materials and suggested activities, and what kind of impact this course has before further sharing the content with others in a public way – we have dedicated an entire learning outcome discussing the evaluation of learning outcomes and this is something we apply for our own practice too!

[End_of_Page]

Act_ID#1.1.6 Creators and inspiration [Hypertext and image]

[Hypertext]

Eleni Myrtsioti

I am a graduate of the Department of English Language and Literature of the Aristotle University of Thessaloniki, and I hold a master's degree in communication and digital media from the Vrije Universiteit Brussel in Brussels. This year I am a student in the E-Learning Master's Program at the University of Piraeus.

The real force behind the creation of this course are the numerous authors and contributors of the European Framework for the Digital Competence of Educators (DigCompEdu) and EntreComp: The Entrepreneurship Competence Framework (EntreComp). You will find a piece of their work and thought process in every part of this course; these two documents emphasize on the necessity of their use in education and most certainly if used correctly can be the inspiration for a great number of courses, workshops and events that can help teachers create new materials and resources, helping their students acquire very useful skills.

[End_of_Page]

1.2 Prerequisites

Act_ID#1.2.1 Prior knowledge and skills [Hypertext]

[Hypertext]

The micro-MOOC aims at equipping participants with the necessary skills to qualify for competence levels B1 – Integration and Level 3 – Experiment for digital and entrepreneurial skills respectively. These levels are equal, and course participants are expected to be already independently or with minimal guidance able to:

- Use digital tools and platforms. This includes familiarity with using the internet, basic software applications, and possibly some experience with educational technology tools like LMS (Learning Management Systems).
- Design and implement their own lesson plans and content integrating digital technologies to enhance their lesson structure and delivery.
- Have a foundational knowledge of teaching methods and educational theories. This will facilitate their understanding on how digital interventions integrate with and enhance traditional pedagogical approaches.

- Understand assessment concepts and techniques. This includes knowledge of formative and summative assessments, rubrics, and feedback mechanisms.
- Develop and pitch innovative project ideas to their students applying entrepreneurial skills to organize and lead school initiatives; skills include leadership, teamwork, resource management, and problem-solving to initiate and manage school improvement projects.

[End_of_Page]

Act_ID#1.2.2 Minimum technical requirements[Hypertext]

[Image]

Figure 35: Image depicting the essential technical requirements[12]

[Hypertext]

There are a few technical requirements we would like you to consider in order to attend this course smoothly and make the most out of the experience.

- Access to a computer with an updated operating system. For PCs, this could be Windows 10 or later; for Macs, macOS 10.13 or later; for mobile devices, the latest version of iOS or Android. While you can in theory follow this course from a mobile device, it is not recommended as many features won't be displayed correctly.

[12] Source: The image was created by the author on Canva, ready-made visuals by Canva Creators Team were used and it is available at the creator's account: https://www.canva.com/design/DAGMdkIeG7g/iQ0iJvZfIDJJhIXiZYzKzw/edit?utm_content=DAGMdkIeG7g&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

- Use of headphones with a working microphone. A webcam might be needed for video conferencing or assignments that require video submissions.
- Personal email account where we will be sending daily and weekly reminders about deadlines and newly available content.
- Stable Internet connection. A stable and reasonably fast internet connection is crucial, especially for streaming video lectures and participating in live sessions. Broadband is recommended, with at least 1 Mbps speed for streaming.
- A modern web browser like Google Chrome, Mozilla Firefox, Safari, or Microsoft Edge. It's important to keep your browser updated to the latest version for security and compatibility reasons.
- The ability to download and sign-into applications.

[End_of_Page]

1.3 Completing the course

Act_ID#1.3.1 Necessary actions to complete the course [Hypertext]

[Hypertext]

To complete this course successfully and timely you should:

- Watch all the educational material of the four micro-MOOCs (this activity as well as the time spent can be confirmed via the system).
- Implement all the activities included in all micro-MOOCs. In particular you should have completed. More specifically, you need to complete:
  - the practice activities
  - the self-assessment activities
  - the open response tasks (ORA) and self-assess them based on the rubric

You also need to:

- participate in the forum by submitting at least one answer
- answer the self-assessment poll of the four sections
- achieve a grade >70% in the final course Assessment quiz

At any time, you can monitor your progress from the Progress Tab.

Useful tips and advice!

- Log in frequently to stay updated with course materials, discussions, and announcements. Active participation in forums and group activities can enhance understanding and engagement.
- Stay on top of deadlines for assignments, quizzes, and exams. Completing these on time is crucial for progressing through the course and ensuring you meet all requirements. You can consider using a calendar.
- Thoroughly read and watch all provided content, including lectures, readings, and supplementary materials. Take notes and review them regularly to reinforce learning.
- Don't hesitate to ask questions if you're unsure about something. Use discussion boards, office hours, or direct messages to communicate with instructors and peers.
- Take advantage of any additional resources Open edX offers, such as study guides, practice problems, and community forums. These can provide extra support and deepen your understanding.
- Confirm that you meet certification requirements.

[End_of_Page]

Act_ID#1.3.2 Open Response Assessment (ORA) for self-assessment [Hypertext]

[Hypertext]

In every Micro-MOOC you will observe that you will proceed with self-assessment using the open response assessment feature (ORA). This feature allows learners to complete and submit written assignments, projects, or other types of open-ended responses, which are then evaluated through a combination of self-assessment, peer assessment, and/or instructor assessment. An open response assessment is an assessment type that allows you to submit:

- written essays
- file attachments such as a PDF or image (read more: Submit a file with an ORA response)
- links to work outside of edX.org (such as a lab notebook)

When you submit a response to an ORA, your submission may be reviewed and graded by:

- yourself! This is called the self-grading step.

- your peers in the course. This is called the peer grading step. **You will be required to review your peers' submissions, and you might have to wait a while for a grade from your peers.**
- your instructors. This is called the staff grade step. **You might have to wait a while for a grade from course staff.**

The required review steps may be any combination of self-assessment, peer assessment, or staff grades. There may also be a training step to guide you through how to submit.

Adapted from source: https://help.edx.org/edxlearner/s/article/What-s-an-open-response-assessment-ORA

[End_of_Page]

Act_ID#1.3.3 Forum participation [Hypertext]

[Hypertext]

Every Micro-MOOC has its own dedicated discussion forum where course participants can interact, and exchange views and tips. While each discussion forum reflects the content of the respective Micro-MOOC and we encourage you to avoid off-topic discussions, you can freely express yourselves especially when in doubt.

- Introduce yourself with a brief post to connect with peers.
- Make sure to avoid duplicates by searching for posts or threads about the same topic or question.
- Make sure to use brief but concise titles for every new thread. Make sure to describe your thoughts or questions in a concise manner. You will be receiving an email every time someone responds to you, please make sure to acknowledge their effort to reply.
- Remain polite and respectful even if you disagree with other participants.
- We take bullying and harassment very seriously; do not hesitate to report and flag an offensive message and feel free to forward it to tech support.
- Advertising content is prohibited.
- Protect your privacy and that of others; do not share personal details such as addresses, passwords, banking details. The course is free and always will be.

Adapted from source:

https://courses.edx.org/asset-v1:IDBx+IDB20.1x+1T2021+type@asset+block@Discussion_forum_guide_CCE_2021.pdf

Act_ID#1.3.4 Final exam of the micro-MOOC [Image and Hypertext]

[Image]

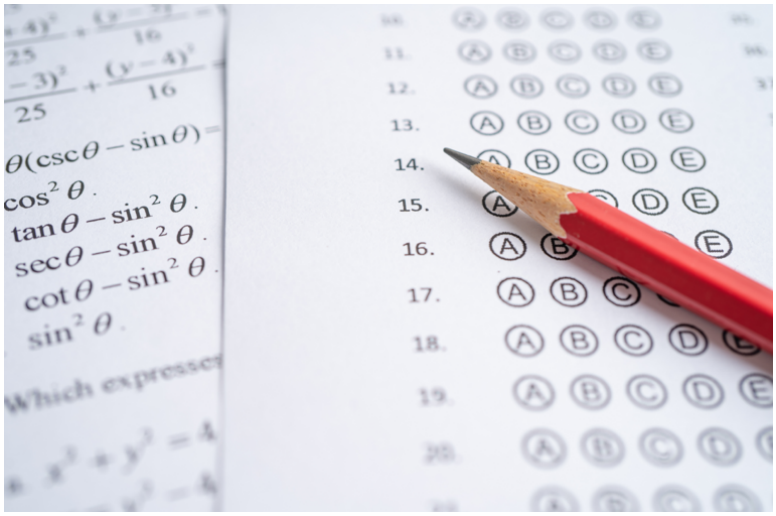


Figure 36: Example of multiple-choice quiz question format[13]

[Hypertext]

The final grade of the course depends on your score at the final exam and needs to be more than 70%.

The final exam consists of 40 multiple choice questions which means five per learning outcome. In order to succeed and receive your certificate you need to answer correctly in 28 questions. For every learning outcome – as a reminder there are eight in the course – you need to respond in five questions; the first three questions examine your knowledge, critical thinking and attitudes while the remaining two concern pedagogy and instructional methods.

There is no time limit but unlike the quizzes and assessments in the course there will be no hints or answers given after two attempts to respond. You have one attempt available to answer the quiz questions, and the estimated time to complete the quiz is 45 minutes.

[13] Source: istock, available at: https://www.istockphoto.com/photo/pencil-on-answer-sheets-or-standardized-test-form-with-answers-bubbled-multiple-gm949489254-259194694

[End_of_Page]

Act_ID#1.3.5Getting your certificate [Image and Hypertext]

[Image]

Figure 37: Example of certificate of attendance[14]

Certifications are always a welcome acknowledgment of our efforts; especially in this course you are able to receive a certificate of completion for this micro-MOOC before moving on to rest courses of the micro-Masters series of courses.

Make sure to check the calendar of the course and that you don't miss out any important deadlines, if you complete all assignments, assessments and engage with the necessary course materials you will be able to receive your certificate!

[End_of_Page]

1.4Introducing the topics

Act_ID#1.4.1 What do you know already about our topics[Hypertext, Poll on Quizizz]

[Hypertext]

Before we move on with Micro-MOOC 1, let's have a quick poll to ensure first and foremost that this course is of value to you and to what extent you feel ready to proceed. The result of the poll plays no role in your overall grade and there are no right or wrong answers really.

[Poll - Quizizz]

[14] Source: Canva, modified by the author and available at author's account at: https://www.canva.com/design/DAGMpaqsS4s/ubnCqpYQ6onZpPYj5njS8Q/edit?utm_content=DAGMpaqsS4s&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

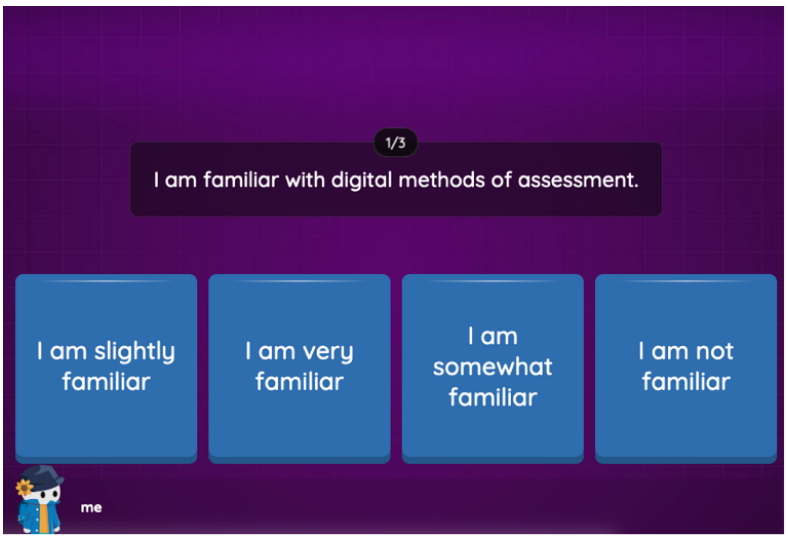


Figure 38: Assessment on Quizizz for Unit 1.4.1[15]

1. I am familiar with the use of digital technologies aiming at improving my lesson plans.

- I am very familiar
- I am somewhat familiar
- I am slightly familiar
- I am not familiar

2. I am familiar with digital methods of assessment.

- I am very familiar
- I am somewhat familiar
- I am slightly familiar
- I am not familiar

3. I am familiar with entrepreneurship programs other schools implement and I am following the developments.

- I am very familiar
- I am somewhat familiar
- I am slightly familiar
- I am not familiar

[End_of_Page]

[15] Source: The quiz was created by the author and is available at: https://quizizz.com/admin/quiz/66cd109b4651ec393d802727?source=quiz_share

Act_ID#1.4.2 Experts Opinion [Hypertext, video, Problem with Adaptive Hint]

[Hypertext]

Before we delve deeper into the content of the course, each Micro-MOOC and Unit separately, we would like you to familiarize yourself with the European Framework for the Digital Competence of Educators and EntreComp: The European Entrepreneurship Competence Framework.

Watch the video below, where we share essential information behind the rationale of the two frameworks, their structure and how they can be relevant for educators.

[Video]

Figure 39: Preview of the introductory video used in Unit 1.4.2[16]

Introducing the DigCompEdu and EntreComp Frameworks [5:15]

[Problem with Adaptive Hint]

Participants receive no instructions or hint regarding the nature of this quiz, they are simply required to fill in the gap to evaluate their understanding. It is considered the briefest assessment option among all assessments and allows for an informal tone.

[16] Source: The video was created by the author of Vidnoz AI and is available at: https://youtu.be/WPl692Mk_r8. The materials used in the video were taken from the two Frameworks and the Vidnoz AI gallery while the video is available under license Attribution Non-Commercial No Derivatives.

Question: Which body oversees the development and dissemination of DigCompEdu and EntreComp? The European ... (correct answer: Commission).

Wrong answers we anticipate and the hints they will get:

Nations → Are you confused?

Parliament → They are busy with different things.

Council → Close enough but no.

[End_of_Page]

Act_ID#1.4.3 Discussion and Introduction Activity [Hypertext and Padlet]

[Hypertext]

We look forward to getting to know you a bit better, and we would like you to share in the Padlet we have prepared below where you come from, what subject and grade you teach currently! You may of course share additional details and thoughts with us, using the plus (+) symbol, while you can also reply and welcome other participants. Remember to be courteous, always. Feel free to share photos, YouTube videos, presentations and anything else supported on Padlet.

Once again, we emphasize on the importance of interaction and dialogue so you may return to this Padlet and keep the discussion going for as long as there are incoming, relevant messages!

[Padlet]

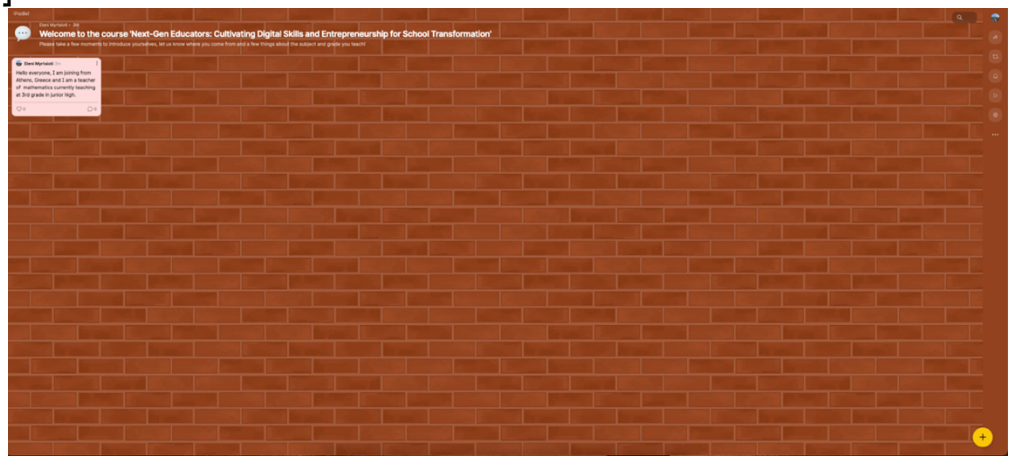


Figure 40: Preview of a Padlet board used in Unit 1.4.3[17]

[17] The Padlet was created by the author and is available in the following link: https://padlet.com/emyrtsioti/welcome-to-the-course-next-gen-educators-cultivating-digital-jow2nqsh5bvqf29d

[End_of_Page]
[End_of_Topic]

Day 2: Micro-MOOC 1- Digital pedagogy and classroom transformation (3 hours)

2.0 Introduction

Act_ID#2.0.1 Learning outcomes[Hypertext and Google Forms - Poll]

[Hypertext]

Following the successful attendance of this Micro-MOOC, you will be able to use independently technologies related to the teaching and guidance processes, as defined in DigCompEdu for the competence level B1. More specifically:

- You will be able to understand the characteristics and skills needed for digital teaching
- You will be able to understand how EdTech products like the interactive whiteboard can transform your practice.

We would like you to respond to a few questions below self-evaluating your previous experience or knowledge. You may come back to the poll if you wish to see what other participants have responded and potentially initiate a discussion in the forum area. These responses will not affect your final grade.

[Google Forms – Poll]

Poll 1: How familiar are you with digital technologies and the notions of digital teaching and learning overall?

- I am very familiar
- I am somewhat familiar
- I am slightly familiar
- I am not familiar

Poll 2: To what extent do you think technologies like interactive whiteboards could assist your own students in the context of the subject you teach?

- They will have no impact whatsoever.
- They can assist my practice but won't have an impact on the students' learning experience.
- It will assist my teaching if manage to find a way to engage my students meaningfully.
- We have been using whiteboards at school and they greatly assist the teaching and learning process.

Poll 3: How often do you use instructional models like blended learning (hybrid learning)?

- Daily
- Weekly
- Rarely
- Never

Poll 4: Based on your experience or personal opinion, to what extent do digital technologies enhance academic performance and collaborative learning?

- They have minimal impact on either.
- They can make a difference presuming that they are used in moderation.
- They can have significant impact because learners receive timely assistance and can work together in real time.
- They are detrimental to academic performance; both teachers and students can save time with their use, they facilitate remote learning and improve learners' digital competencies overall.

[End_of_Page]

2.1 Digital teaching: characteristics and skills

Act_ID#2.1.1 Presentation Unit 1.1 [Image, hypertext, presentation]

[Image]

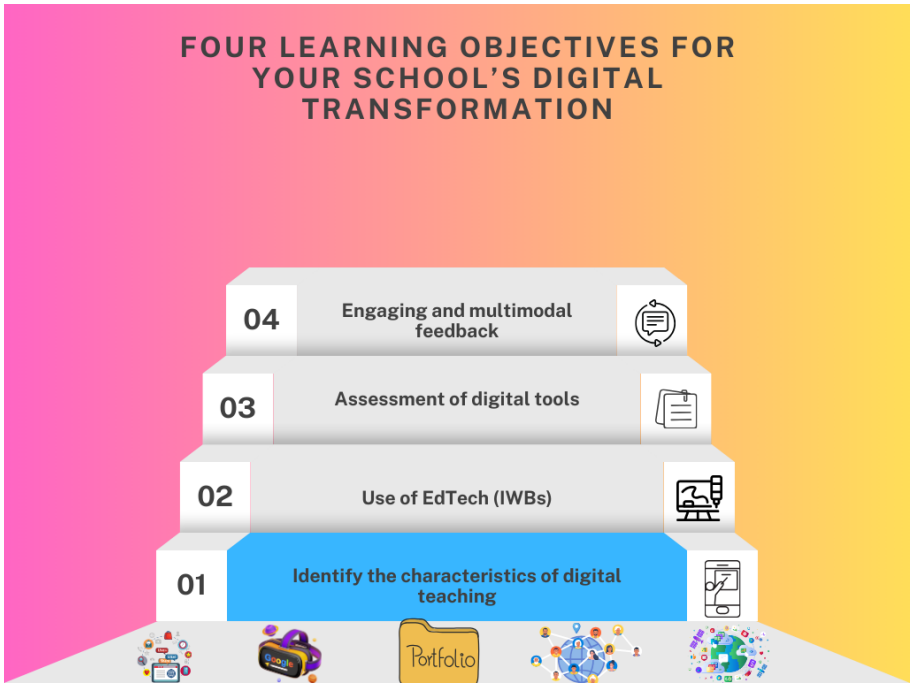


Figure 41: Stepwise visual representation of the four key learning objectives for digital transformation in schools used in Unit 2.1.1[18]

[Hypertext]

Developments in education and the rise of multiple EdTech solutions in terms of hardware and software are running with an incredible speed and in this initial Unit dedicated to digital teaching (DigCompEdu core competence Area 3, Competence 3.1 Teaching) we would like to present the basic characteristics and skills needed for teachers today.

Teachers traditionally wear multiple hats and the successful digital transformation of a school comes down to these factors: teachers' own competence in using tools and managing existing educational resources, the choice of instructional methods that facilitate technology integration to the maximum degree (e.g., blended learning and use of appropriate hardware), student engagement, feedback and assessment. There are numerous ways especially in terms of infrastructure a school can be improved; for the level of competency, we are targeting in this course (B1) we take into consideration that course

[18] Source: Created by the graphic designer Lenora on Canva and adapted by author for this course; available at: https://www.canva.com/design/DAGN7pSf4uw/Oq2N1BrJVHW5EDphdxY51A/edit?utm_content=DAGN7pSf4uw&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

participants already have some basic skills in using the Internet and their computers and we are now delving into the aforementioned skills which we broke down for the needs of this course.

In the presentation below, you will find the most important information about teaching in the digital age, structured in a way to reflect the research and findings of DigCompEdu on teachers' skills and competencies. We hope that by the end of the course you will be motivated to start building your own portfolio of materials online.

[Presentation]

Figure 42: Previewing the presentation used in Unit 2.1.1[19]

[End_of_Page]

Act_ID#2.1.2 Demonstration Unit 1.1 [Hypertext, video]

[Hypertext]

In this Unit, we are going to demonstrate how to create your own e-portfolio of materials, in order to use it in your classroom. The creation of your own portfolio will allow you to

[19] Source: Created by the author on Canva and available at: https://www.canva.com/design/DAGM791QKbo/L_JUC7CSrJfCRvLnahZWQQ/edit?utm_content=DAGM791QKbo&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

teach in a way that embodies every competence that Key Area 3 Teaching and Learning of the DigCompEdu Framework includes.

If you ask one of your colleagues '*What do you understand by teaching for the digital age?*' they will probably refer to distance teaching and the use of tools like Zoom, use of collaborative tools like online documents and if very advanced the use of virtual labs like Phet Colorado. What if we told you that you can create an e-portfolio where you can upload, save, update and access from everywhere all your materials including videos, online forms, fact sheets and presentations, while also being able to upload every item that has the embed code feature? It is our belief that teachers are among the strongest and best content creators out there, there is no reason not to be able to collect your work in one place, improve it and share it with others!

Watch the brief video below and see how you can create your first e-portfolio using Google Sites.

[Video]

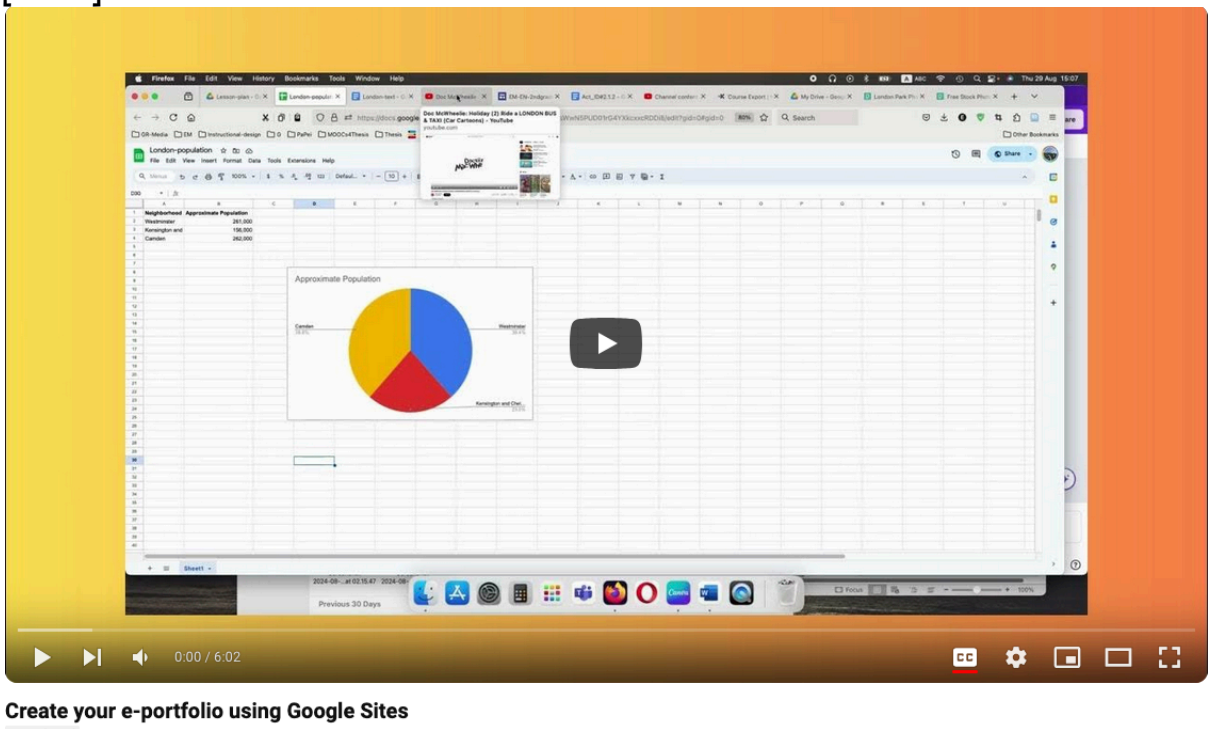


Figure 43: Preview of video on e-portfolio creation used in Unit 2.1.2[20]

[20] The video *Create your Portfolio on Google Sites* [6:02] was created by the author and is available at: https://www.youtube.com/watch?v=uki2CZIut2s under license Attribution Non-Commercial No Derivatives

[End_of_Page]

Act_ID#2.1.3 PracticeUnit1.1 [Hypertext, Image Mapped Input,

[Hypertext]

In this practice Unit, we would like you to experiment with the Image Mapped Input feature in order to exercise your memory and reflect on the demonstration video earlier. This mini test is obviously meant to help you remember the basics of a Google Sites landing page and carries no weight towards your final grade!

[Image Mapped Input]

Google Sites is a user-friendly website for beginners who wish to start their own portfolio. You can easily customize the landing page before adding more features. Click below to indicate from where you can add basic elements, change the title of the portfolio and customize the header with the photo of your choice. You can implement these changes by clicking twice on Sites, but where do you need to click?

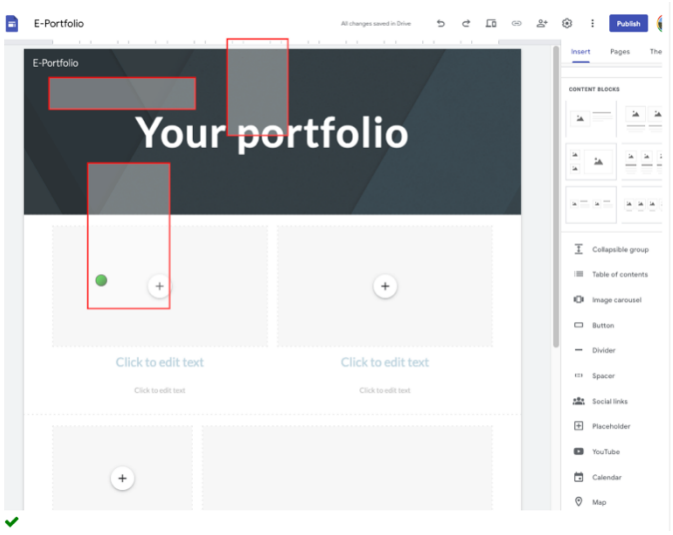


Figure 44: Image Mapped Input assessment feature integrated on Open edX[21]

Bonus Task – Create your template at your own pace!

A portfolio consists of several materials which correspond to your classes and subjects. Presuming that you are for example an ICT teacher that also collaborates with the Physics

[21] Source: The screenshot was taken by the author directly from studio.edunext.co

instructor for projects you need to categorize your materials according to a) class or level, and b) content or subject.

We want you to try and create the first page of your porfolio where you list your materials like the way we described above or according to the tools used. You can have a sub-category for example for software or hardware used in class. This exercise will help you understand how to better structure and archive your materials. And who knows, one day you might decide to publish your original portfolio or help University students! When you are done, go to the forum area and exchange opinions with other teachers:

[Discussion forum]

a) was it a useful exercise?

b) did you notice anything in particular? (e.g., do you rely a lot on outdated textbooks?)

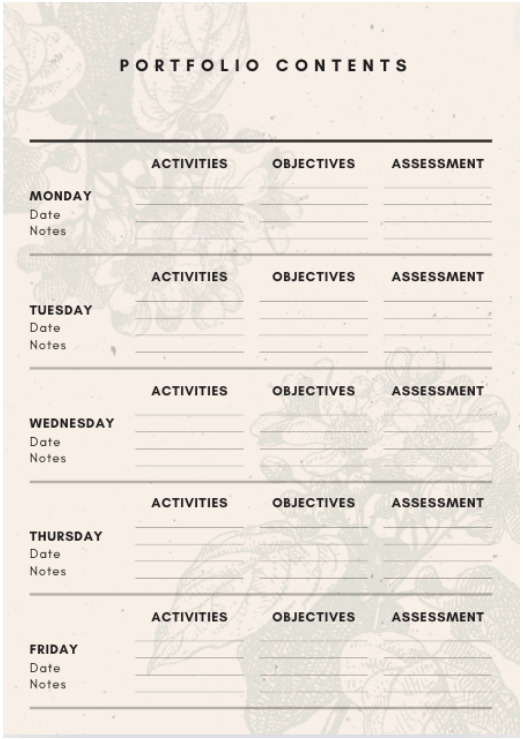


Figure 45: Example of worksheet for teachers used in Unit 2.1.3[22]

[22] Source: The template was originally created by the Canva Creative Studio team and adapted by the author of this course. It is available at the author's account at: https://www.canva.com/design/DAGOTCz-4vQ/gKJe17vAPilpyGnUkIVP0A/edit?utm_content=DAGOTCz-4vQ&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

[End_of_Page]

Act_ID#2.1.4 Self-evaluation Unit 1.1 [Hypertext, Drop Down Problem with Hints and Feedback]

[Hypertext]

In the following scenarios your attitude towards digital teaching methods will be examined. Take the opportunity to evaluate where you currently stand by choosing a response you consider correct; you may try again as many times as you wish and once you find the correct answer the explanation will be available to you. Your responses will not impact your final grade in any way.

[Dropdown problem with Hints and Feedback]

Scenario 1: Proposal to school administration

Eleni, an English teacher in a primary school, is dedicated to meeting her students' diverse needs by adapting her lessons to their varying levels of English proficiency. With her own designated classroom, she is eager to enhance her teaching through the use of EdTech tools. However, the school administration is hesitant to approve her requests due to concerns about cost, limited funding, and the lack of expertise in using these tools.

To address this challenge, Eleni decides to apply a behaviorist strategy by demonstrating the effectiveness of EdTech tools through positive reinforcement. She believes that showing tangible improvements in student outcomes and reducing the administration's perceived risks will help persuade them.

Question: Which strategy should Eleni use to convince the administration to acquire and use more digital tools?

A) She should present a comprehensive budget outlining the costs and potential savings over time. She can emphasize long-term benefits and possible cost-sharing opportunities.

B) She can propose starting with a small pilot program using free or low-cost EdTech tools. She can track student progress and present data to the administration, showing how these tools improve learning outcomes.

C) She can suggest professional development sessions for teachers to build expertise in using EdTech tools, making the administration more comfortable with the idea of integrating new technology.

D) She could advocate for parental support engaging parents and the community to raise funds for the tools or to advocate for their importance in enhancing education.

Hints

First hint: Should a teacher get involved in managerial processes in addition to teaching or focus only on pedagogy?

Second hint: A pilot program allows the administration to see the benefits with minimal risk, using data as positive reinforcement to support further investment. This strategy aligns with behaviorist principles by providing positive reinforcement through measurable outcomes.

Third hint: Upskilling is important, but how is it linked with behaviorism?

Scenario 2: Introduction of LMS systems at school

Roxani, a Science teacher, wants to introduce a Learning Management System (LMS) to streamline the administrative and organizational aspects of her teaching, such as managing assignments, grading, providing feedback, and facilitating communication. However, the school administration and her colleagues are skeptical about this new technology, as it has never been used before in the school. Additionally, for a hands-on subject like Science, where students already spend a lot of time in the lab, some teachers question the need for an LMS. Roxani understands that to successfully introduce the LMS, she needs to apply behaviorist principles to shape her colleagues' acceptance of the new tool.

Question: How should Roxani, using behaviorist principles, approach the introduction of the LMS without offending other teachers who are less willing to try out new things?

A) Introduce the LMS as an optional tool and reward early adopters who choose to use it and share positive results with the group.

B) Mandate the use of the LMS for all teachers ensuring that everyone adopts it at the same time.

C) Demonstrate the LMS's effectiveness in a small-scale trial with one class or a specific set of tasks and share the results with her colleagues to demonstrate its effectiveness.

D) Offer to handle the LMS implementation for other teachers reducing their workload and making it easier for them to adopt the system.

Hints

First hint: A reward can serve a reinforcement that can shape behavior and positively impact others to gradually adopt a successful service or product.

Second hint: Imposing something on anyone can lead to resentment which goes against the principles of behaviorism.

Third hint: Exclusion removes the opportunity from some teachers to engage with learning, and therefore new behaviors.

[End_of_Page]

2.2 EdTech: The interactive whiteboard in your class boosting innovation, creativity and collaboration

Act_ID#2.2.1 PresentationUnit1.2 [Image, Hypertext, Canva presentation]

[Image]

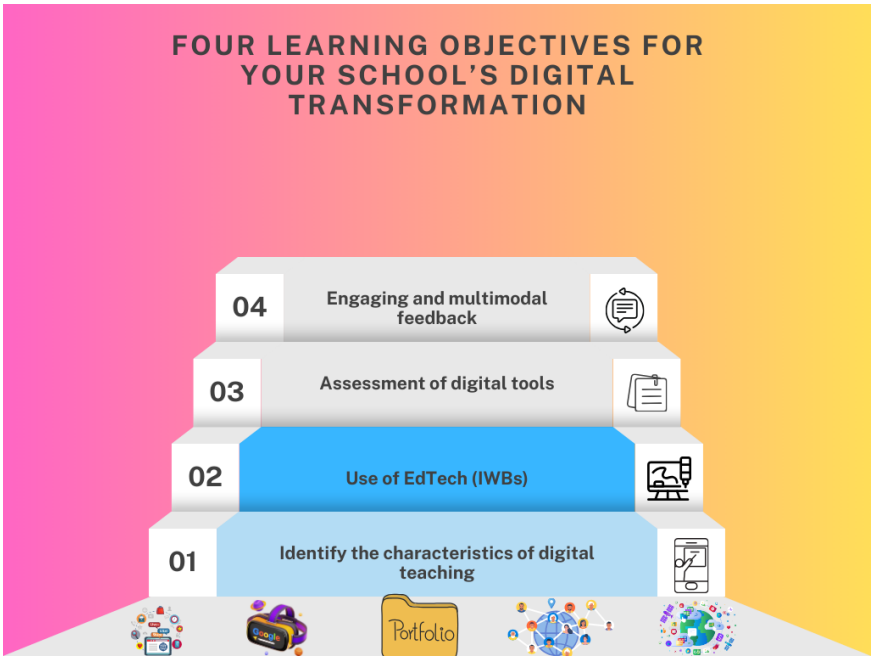


Figure 46: Stepwise visual representation of the four key learning objectives for digital transformation in schools used in Unit 2.2.1[23]

[Hypertext]

Educational technology is a very broad term and most recently a buzz word because of the entrepreneurs in this field. Today more than ever we see a huge number of developers, business professionals and teachers work together, while we see Universities launch their own incubators to produce tools, software, applications and devices to facilitate teaching and learning in the digital age.

For the exact definition of EdTech we are going to use ''*Educational technology (commonly abbreviated as EdTech, or edtech) is the combined use of computer hardware, software, and*

[23] Source: Created by the graphic designer Lenora on Canva and adapted by author for this course; Available at :https://www.canva.com/design/DAGN7pSf4uw/Oq2N1BrJVHW5EDphdxY51A/edit?utm_content=DAGN7pSf4uw&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

educational theory and practice to facilitate learning" (Source: Wikipedia) [24], and while it entails so many things, in this Unit we have chosen to focus on the use of interactive whiteboards (IWBs). Have you observed that established communication tools such as Zoom, Google Meet and MS Teams have improved their features and now include the Whiteboard function? Canva, the prime tool for designers, educators and professionals in creative or not industries have also a dedicated whiteboard space now where users can add contributors and work together. These applications mirror the actual device of interactive whiteboard, that several schools around the world have invested on and acquired, especially during the pandemic, while IWBs are now included in the budget planning of the Ministries of Education, with large corporations actively participating in the process[25] and education providers already in the process of designing seminars and courses on how to use IWBs for teachers in public education[26].

The attention given to this technology is well-deserved, due to its infinite possibilities and a central effort to equip schools should be matched with a coordinated capacity building program.

In the presentation below, we introduce you to interactive whiteboards, their pedagogical value and how they can enhance communication skills. The notion that we look towards a large surface across the room filled with information is common in education as a way to collect, categorize and sort out information. It only makes sense that this tool is so important in education and its evolve has come a long way since the traditional chalkboard in the 18th century and the whiteboard where we use colorful and easy to erase pens to the interactive whiteboards the advanced schools use today.

Key competence Area 3 Teaching and Learning in DigCompEdu greatly emphasizes on the use of resources combine with methodologies, styles of learning and instruction methods (e.g. flipped classroom) and very few technologies embody and promote all the above

[24]Sources: https://en.wikipedia.org/wiki/Educational_technology
Mastellos, N., Tran, T., Dharmayat, K. *et al.* Training community healthcare workers on the use of information and communication technologies: a randomized controlled trial of traditional versus blended learning in Malawi, Africa. *BMC Med Educ***18**, 61 (2018). https://doi.org/10.1186/s12909-018-1175-5
[25]https://www.businessnews.gr/epixeiriseis/item/264931-lg-electronics-hellas-to-mega-deal-stin-ekpaidefsi-me-tous-36-000-psifiakoys-pinakes-kai-to-epomeno-vima-me-ta-rompot
[26]https://t.ly/TAbfb

equally well as interactive whiteboards do (with mobile devices catching up to some extent and for specific uses only).

[Canva presentation]

Figure 47: Previewing the presentation used in Unit 2.2.1[27]

[End_of_Page]

Act_ID#2.2.2DemonstrationUnit1.2 [Hypertext, video, image]

[Hypertext]

Now that we have learnt a few things about interactive whiteboards, it is time to watch a brief demonstration video. Dealing with new equipment can be frustrating and in the brief demonstration video below, you will learn how to use the most essential features of an interactive whiteboard such as creating new pages, using the pen, reordering content, opening folders to insert materials and eventually saving your work. No matter if you use a ready-made application or your own materials, you will need to connect the device to the Internet and from that point onwards the possibilities are endless. Remember, that there are several applications compatible with iOS, Android, Windows or Mac to experiment with

[27] Source: Created by the author on Canva and available at: https://www.canva.com/design/DAGMucgWoNU/W2--fc7i-GSOHWvh3UrcWg/edit?utm_content=DAGMucgWoNU&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

the online version of an interactive whiteboard. This way you will have some edge when the device arrives at your school.

We hope you found this videos useful and inspiring! Did you know that the instructors in this type of videos are not necessarily corporate trainers demonstrating the product, but also teachers? Have you ever considered that teachers are amongst the most resourceful, knowledgeable and charismatic content creators? We hope that this will be your inspiration to create your own materials and use them in class with the help of this powerful tool!

[Video]

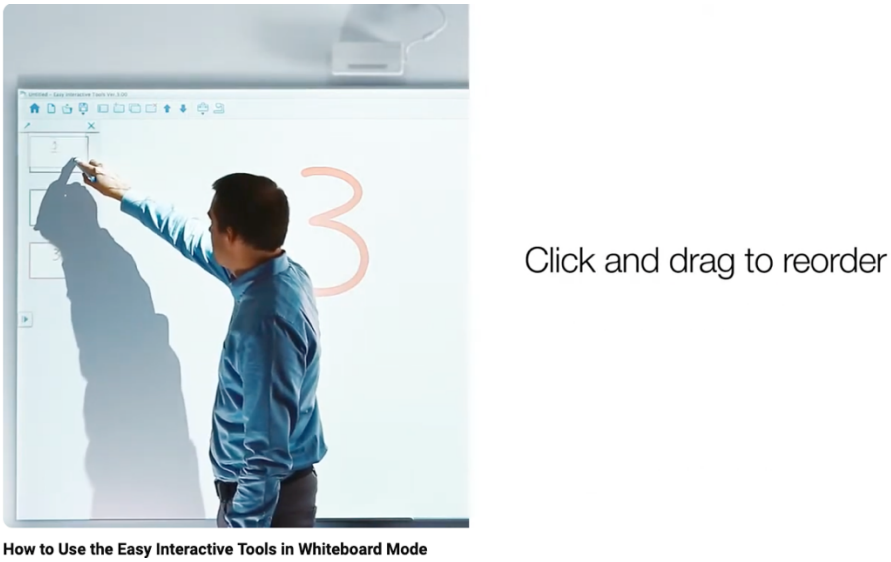


Figure 48: Preview of the video on the use of IWBs used in Unit 2.2.2[28]

[Hypertext]

Fact of the Day!
When exploring the unlimited potential of IWBs, you will gradually start looking for the appropriate applications to download and for Mathematics teachers around the world, GeoGebra is a popular choice. GeoGebra started out in the context of a master's thesis at the University of Vienna, is now owned by the Indian EdTech company Byju with over 150 million registered users and additionally integrated in smart devices present in classrooms

[28] How to Use the Easy Interactive Tools in Whiteboard Mode [3:08]
Source on YouTube: https://www.youtube.com/watch?v=cMcqgTUFQlQ, Creative Commons Attribution License (reuse allowed).

across the world. Think how becoming more tech savvy can enable you to create your own content! It could be even the beginning of a new or parallel career! This is why we also believe that digital skills and entrepreneurship are linked, but we will talk about it later on.

[Image]

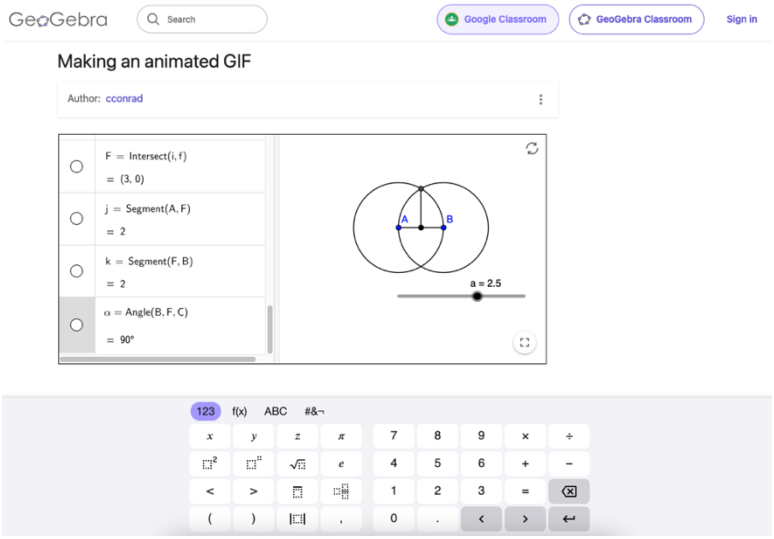


Figure 49: Image depicting the online tool GeoGebra[29]

[End_of_Page]

Act_ID#2.2.3 [Practice] Unit1.2 [Hypertext, Multiple choice quiz]

[Hypertext]

In this practice Unit, we would like you to try out the below brief test where you will reflect on the demonstration Unit earlier on and the video we saw. The presenter introduced you to many features of the interactive whiteboard, with each one matching with an icon. In the test below we are going to remind you a few of the most important features. You can opt to take the test in the form of flashcards.

[29] Source: Geogebra.com, screenshot by the author of this course

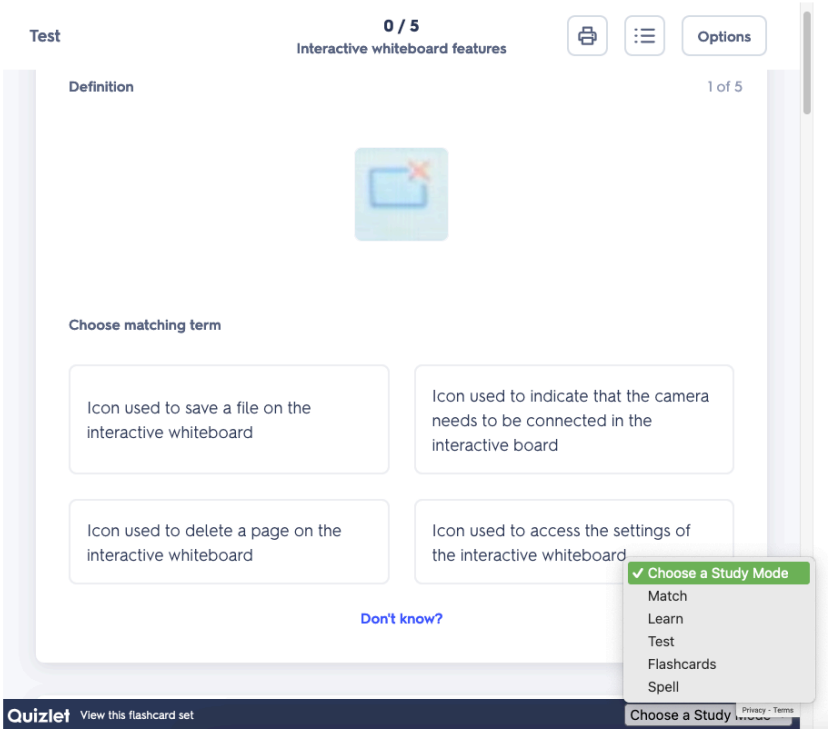


Figure 50: Assessment on Quizlet for Unit 2.2.3[30]

[Hypertext, image]

Bonus Task – Create your template at your own pace!

Being able to use EdTech products and especially so advanced products such as an interactive whiteboard is certainly a privilege not many teachers have. A great addition for your personal portfolio of materials would be a set of instructions for your colleagues on how to use it. Once you fulfil this step, you can move a step forward and create a new set of instructions exploring online interactive whiteboard applications for other teachers who certainly don't have access to it. Through this process, you might be able to form an online community and help each other with recommendations. If you think this is an idea you endorse, visit the forum area and discuss with your peers: a) how can they best support other teachers who don't have access to IWBs, and b) are text-based instructions the best choice to demonstrate examples or would it be better to organize an online event (e.g., webinar)?

[30] Source: Screenshot by the author directly from studio.edunext.co. Flashcards memory game created by the author on Quizlet and available here: https://quizlet.com/gr/936642420/interactive-whiteboard-features-flash-cards/?i=5zp9it&x=1jqt

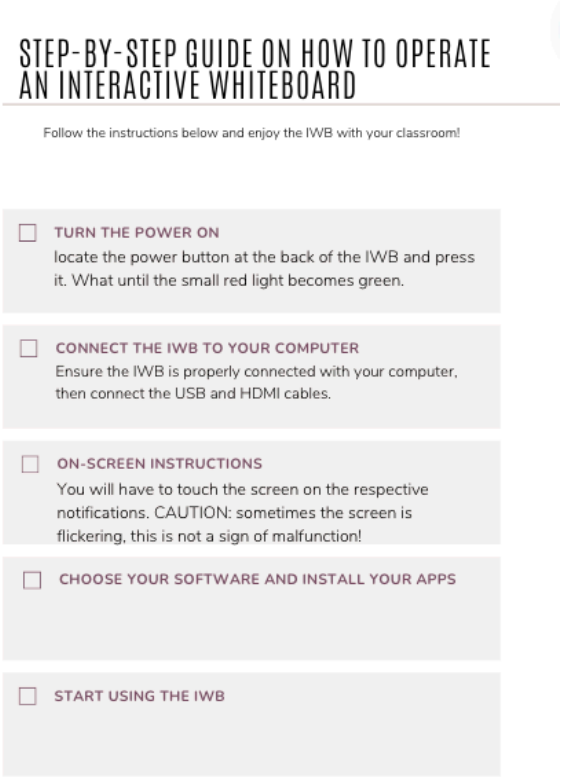


Figure 51: Example of worksheet for teachers used in Unit 2.2.3[31]

[End_of_Page]

Act_ID#2.2.4 Self-evaluationUnit1.2 [Hypertext, Drop Down Problem with Hints and Feedback]

[Hypertext]

In the following scenarios, your attitude towards EdTech solutions and especially the use of an interactive whiteboard and software applications will be examined. Take the opportunity to evaluate where you currently stand by choosing a response you consider correct; you may try again as many times as you wish and once you find the correct answer the explanation will be available to you. Your responses will not impact your final grade in any way.

[31] The template was originally created by graphic designer Nihaad on Canva and was adapted by the author. Available at the author's account: https://www.canva.com/design/DAGOTLHw_KI/512EK40NyXePZ29602QPgQ/edit?utm_content=DAGOTLHw_KI&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

[Drop Down Problem with Hints and Feedback]

Scenario 1: Vasiliki, a mathematics teacher in junior high school, wants to integrate certain technologies in her practice, and requests for an interactive whiteboard to enhance student engagement through the principles of the Constructivist Learning Theory. The school's principal is concerned that the educational benefits won't worth the investment.

Question: How could Vasiliki reverse this unfavorable view and convince him?

A) Provide relevant research and case studies that suggest the opposite and highlight the benefits of their use.

B) Mention that the acquisition of such technology automatically improves learners' performance.

C) Mention that apart from the Constructivist Learning Theory, IWBs can be used in more subjects maximizing their use that way.

D) Ask from teachers from another school who are already using IWBs to instruct a workshop in order to demonstrate its capabilities.

Hints

First hint: New technologies, methodologies and approaches were most certainly always met with skepticism at least in the beginning.

Second hint: Try to remember or search again what constructivism theory supports when it comes to online learning and the use of technology.

Third hint: The best way to reverse these unfavorable opinions is the provision of evidence, in this case scientific research combined with case studies.

Scenario 2: The school Artemis works at recently had a capacity building program about the application of Bloom's Taxonomy in teaching. They already have an interactive whiteboard, and they are contemplating what to include in the new curriculum for next academic year.

Question: Which activities should they consider maximizing the use of IWBs according to its capabilities while highlighting Bloom's Taxonomy?

A) Recall quizzes that boost memorization instead of application, analysis and synthesis.

B) Repetitive and mechanical practice of skills, especially for STEM subjects, where students solve the same exercise until they comprehend it.

C) Unguided group work, where students take the initiative to work without structured guidance.

D) Interactive drills such as drag and drop activities where students are forced to remember, creation of stories on storyboard applications where students are encouraged to create.

Hints

First hint: Try to remember what the six levels of Bloom's Taxonomy are and link them with types of assessment.

Second hint: How important is repetition for STEM subjects? Is it a priority?

Third hint: Is unguided work or any instructional practice relevant for Bloom's Taxonomy?

[End_of_Page]

2.3 Recap and self-assessment

Act_ID#2.3.1 Micro-MOOC 1 recap [Hypertext]

[Hypertext]

In the first Micro-MOOC we learned about:

- Key Competence Area 3 Teaching and Learning (suggestions about the organization, management and integration of digital technologies in lessons).
- Which are the characteristics and skills a teacher should have in the digital age.
- Examples of technologies a teacher can use in terms of hardware and applications.
- Which pedagogical theories and models can be used in this process.
- How to create an e-portfolio of materials.

We also saw:

- Examples of activities that teachers can create combining pedagogical methods and tools.
- Through the scenarios we were exposed to real-life situations we might have to deal with in reality and how to better prepare.
- How the use of technologies can transcend the skills taught in isolated subjects and the shift towards issues of online safety and digital citizenship.

[End_of_Page]

Act_ID#2.3.2 Open Response Assessment Assignment: Report

[Open Response Assessment–Self-assessment only]

The rationale

Having at your disposal the latest technologies as a teacher is a privilege and guarantees to a great extent support from the school community. Especially in the European Union we see every year very important studies, publications and Frameworks being published or updated to support educators. It is important to participate in projects as an educator and claim funds, and if successful one of the prerequisites is to write a report in the context of the capacity building part of the project you just participated.

The task

You have received funding from Erasmus+ on a project about digital skills, the use of LMS, the creation of e-portfolios and learning activities ideas that you can try out with your students and other colleagues while using projectors and interactive whiteboards. You need to draft a report for the project manager so they can evaluate the use of funds and your progress.

Useful tips

- The report should be at least 400 words and cover all criteria.
- You need to mention how the practices supported by the project improved your practice.

- You need to indicate whether you would be interested in creating a course in the future for other educators and which part you would be willing to design.

Brief description of the criteria

- I have dedicated at least a paragraph for every methodology, tool or learning activity I participated into giving detailed and constructive feedback.
- I showed that I understand the scope of the project and gave constructive feedback to the managers on what to include in a potential second run.
- I gave feedback about my students' response in the learning activities.
- I described in detail how I involved other colleagues in my practice.

Table 11: Rubric used in the Open Response Assessment in micro-MOOC 1

Criteria	1 –Needs improvement	2 - Satisfactory	3 - Proficient	4 - Exemplary
Organization, structure and content	The report is unclear and poorly organized, while important information is missing.	The report has some structure but lacks clear organization and coherence, I failed to include everything.	The report is well-organized with clear and logical progression of ideas, I have included everything.	The report is excellently organized, presenting ideas in a clear, logical, and engaging manner while apart from my complete coverage of topic I included examples and suggestions that complement my report more.
Complete understanding of the project's scope	I wasn't able to understand all the tasks I had to fulfil and this is reflected in a rather brief and poorly written report.	The report is incomplete because I had few but major questions about the project.	The report reflects my good understanding of the project's scope and although not extremely detailed I have fulfilled all my tasks.	The report thoroughly covers all key areas, providing detailed insights and analysis.
Constructive Feedback to Project Managers	My feedback is vague, unconstructive, or missing.	My feedback is complete for the most part but lacks	I managed to provide constructive feedback with	I provided a detailed and constructive feedback with

Criteria	1 –Needs improvement	2 - Satisfactory	3 - Proficient	4 - Exemplary
		specific suggestions for improvement.	some specific suggestions for improvement.	clear, actionable suggestions for improvement about the chosen tasks and I also included ideas for future reference.
Student Response	In my report I have provided little to no information on how students responded to the new tools and programs.	I discussed my students' response but I didn't use specific examples or data.	My report describes well how my students responded, and I also included some examples or data.	My report provides a comprehensive analysis of student responses, supported by specific examples and data.
Teacher Collaboration	My report does not address whether collaboration among teachers improved.	In my report I did mention how teacher collaborated but I provided very little detail.	My report describes well how teacher collaboration improved and includes some examples.	My report thoroughly analyzes the improvement in teacher collaboration, supported by specific examples and evidence.

Criteria prompts:

- Structure the report in such a way to reflect the methodology and tools used, as well as the learning activities.
- The comments we provide reflect our own understanding.
- Feedback is important to others especially if they are the ones who created or run a project.
- The way your students react to various activities is a helpful tool to understand how to improve your practice.
- By listing issues in teacher collaboration, you help others improve the way they approach this issue.

[End_of_Page]

Act_ID#2.3.3 [Self-evaluation] Checklist: I can… [Hypertext, Poll, Word cloud Quizizz, W3Schools, Get Bootstrap, Imgbb]

[Hypertext]

The purpose of this checklist is for you to determine whether you feel confident dealing with issues discussed in this unit. You might find it useful in detecting whether you need additional study or support; in the next Unit you will have the opportunity to discuss these topics with your peers at the forum area and in the final Unit we will provide an indicative list of resources for you to consider.

[Poll]

1. I can describe to a trainee teacher what DigCompEdu key Area 3 Teaching and Learning is about with regards to teaching in digital age.
   - No, I cannot.
   - Potentially with some assistance.
   - I can confidently do that.
2. I can collect and upload my teaching materials on a device and a designated digital space; either my laptop and cloud or create an e-portfolio and use it with my students via smartboard.
   - No, I cannot.
   - I can do that with some assistance.
   - I already have my materials uploaded on the school's cloud storage and I can create an e-portfolio.
3. I know what an interactive whiteboard is and how it differs from the projector we used to have at school that required a computer.
   - Yes, I know what it is and how they differ, but I cannot use it without assistance.
   - Yes, I know what it is, and I am familiar with its functionalities.
   - I am not sure I understand the difference in terms of connectivity.

[Word Cloud – Quizizz]

If you could describe this Micro-MOOC in no more than three words, which ones would you use?

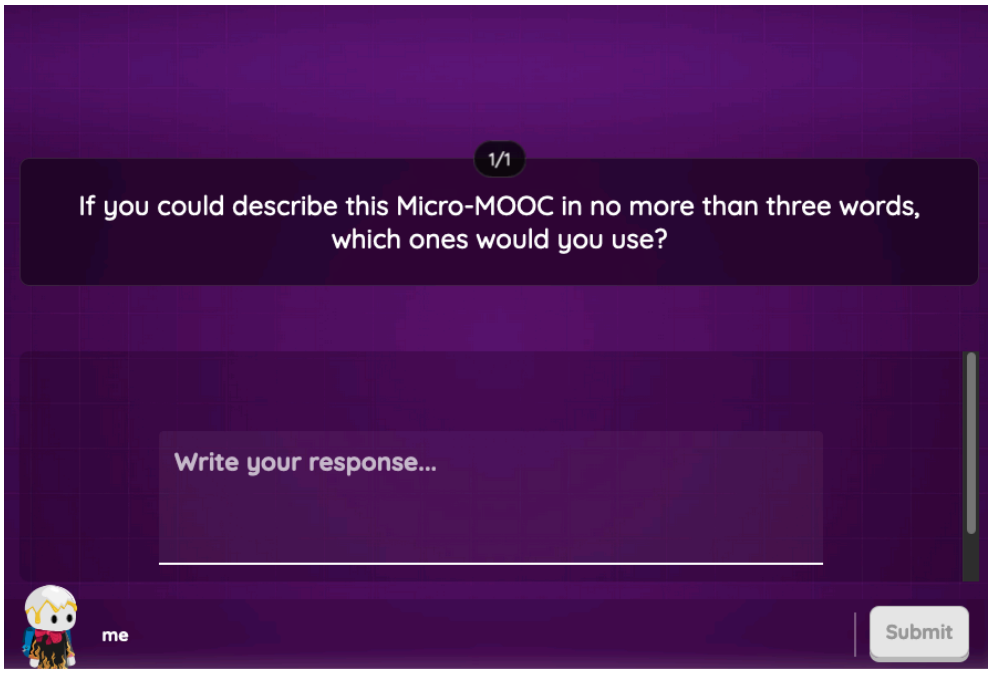


Figure 52: Preview of Quizizz used for feedback purposes in Unit 2.3.3[32]

[W3Schools]

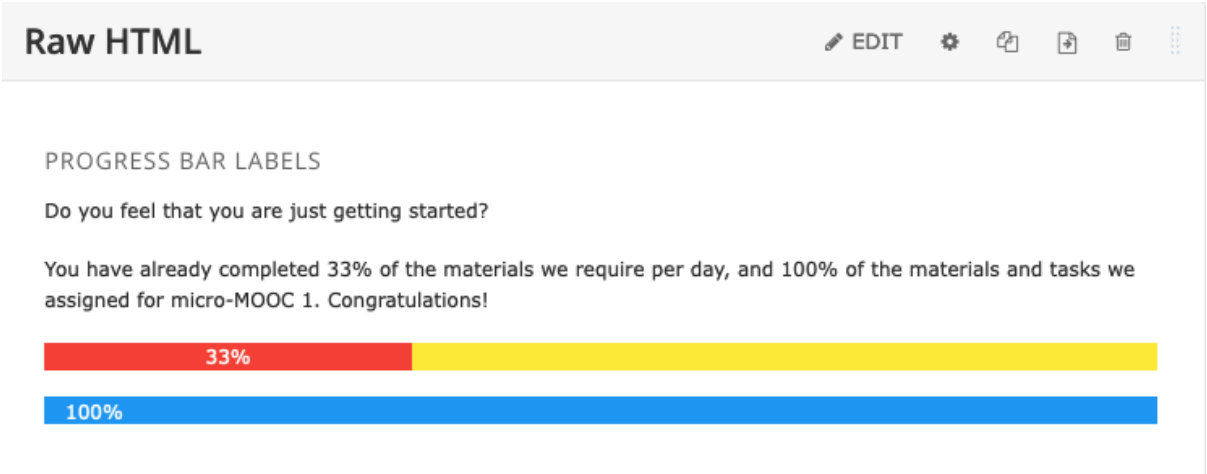


Figure 53: Image depicting the open-source tool W3Schools and the progress bar in Unit 2.3.3[33]

[Get Bootstrap - Badge]

[32] Source: Screenshot by the author, the assessment was created by the author on Quizizz and is available at: https://quizizz.com/admin/quiz/66d0b82fbe52086b8bf318f8?source=quiz_share

[33] Progress bar with positive reinforcement message to help participants track their progress in the course. Created by the author directly on Edunext with customized HTML code found on the open-source website W3Schools. The respective category is available here: https://www.w3schools.com/w3css/w3css_progressbar.asp

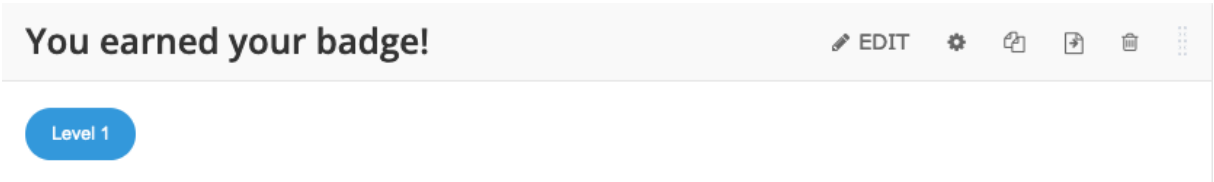


Figure 54: Image depicting the Level badge for Unit 2.3.3[34]

[Canva and Imgbb]

Figure 55: Image depicting the accomplishment badge created on Canva and generated on Imgbb for Unit 2.3.3[35]

[End_of_Page]

Act_ID#2.3.4 Discussion Forum [Hypertext, Discussion forum]

[Hypertext]

We encourage you to visit the forum area and discuss with your peers about the two following topics. Feel free to respond, quote others and of course start as many new threads as you wish!

1) How can e-portfolios specifically and the use of digital tools more broadly make teachers reflect on their practice so far? How do you anticipate their use will impact your own practice?
2) If you had to coordinate the creation of teaching materials in a digital space, how would you support teachers of different grades and/or subjects? Do you think they

[34] Created by the author directly on Edunext with customized HTML code found on the open-source website Get Bootstrap. The respective category is available here: https://getbootstrap.com/docs/4.0/components/badge/

[35] Designed by the author on Canva and embedded on Edunext with an HTML code generated on https://imgbb.com/
Available at: https://www.canva.com/design/DAGRmeEgjqk/F-yWlGH-BhgTrMx6gWpehA/edit?utm_content=DAGRmeEgjqk&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

can all benefit equally from the use of applications, e-portfolios, LMS systems and IWBs?

2.4 Additional resources and material

Act_ID#2.4.1 [Recommendations for further learning]

- Mercer, N., Hennessy, S., & Warwick, P. (2010). Using interactive whiteboards to orchestrate classroom dialogue. *Technology, Pedagogy and Education*, *19*(2), 195–209. https://doi.org/10.1080/1475939X.2010.491230
- Northcote, M., Mildenhall, P., Marshall, L., & Swan, P. (2010). Interactive whiteboards: Interactive or just whiteboards? *Australasian Journal of Educational Technology*, *26*(4), Article 4. https://doi.org/10.14742/ajet.1067
- Vuorikari, R., Kluzer, S., & Punie, Y. (2022, March 17). *DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes*. JRC Publications Repository. https://doi.org/10.2760/115376
- Μπακοπούλου, Μ. (2023, May 31). *LG Electronics Hellas: Η εταιρεία που συμμετέχει στο πρόγραμμα παράδοσης 36.000 ψηφιακών πινάκων στα σχολεία - Το επόμενο βήμα με τα ρομπότ - BusinessNews.gr*.

[End_of_Page]
[End_of_Topic]

Day 3: Micro-MOOC 2 –The importance of assessment and evaluation in the digital age (3 hours)

3.0 Introduction

Act_ID# 3.0.1 Learning outcomes [Hypertext, Google Forms – Poll]

[Hypertext]

Following the successful attendance of this Micro-MOOC, you will be able to understand the difference between formative and summative assessment transferring them to the digital space; you will also be in a position improve your feedback processes making them more engaging and communicative as suggested in DigCompEdu for the competence level B1. More specifically:

- You will be able to design and implement effective assessment strategies (summative, formative) for digital learning environments.
- You will be able to give feedback using digital tools and multimodality engaging your students in the process.

We would like you to respond to a few questions below self-evaluating your previous experience or knowledge. You may come back to the poll if you wish to see what other participants have responded and potentially initiate a discussion in the forum area. These responses will not affect your final grade.

[Google Forms – Poll]

Poll 1: Can you tell the difference between formative and summative assessment?

- I am not aware of any difference.
- I know there are two types of assessment, but I have no deep knowledge.
- I am aware of these two types of assessment, and I am learning more at the moment.
- I am well aware of these two types of assessment, which I use successfully every day.

Poll 2: Have you ever tried to transfer every assessment you design in the digital space?

- No, I never deviate from things I have been doing for years since they work out well.

- No, there are many forms and activities of assessment for both without going online.
- Yes, I design simple multiple-choice quizzes and online discussions, but I am still learning how to provide more example of online assessment for my students.

Poll 3: Do you provide feedback to your students, or do you rely on final grades at the end of the semester so they form an opinion on where they stand?

- Daily
- Weekly
- Rarely
- Never

Poll 4: Do you try to make your feedback engaging using tools and communication so that your students look forward to it and not get intimidated?

- I don't know how to do that.
- I try to personalize my feedback by adding comments and stickers.
- I openly discuss everyone's feedback with my group of students.
- I organize individual meetings combined with a personalized printed report.

[End_of_Page]

3.1Formative and summative assessment with the use of technology

Act_ID# 3.1.1 Presentation Unit 2.1 [Image, Hypertext and Canva presentation]

[Image]

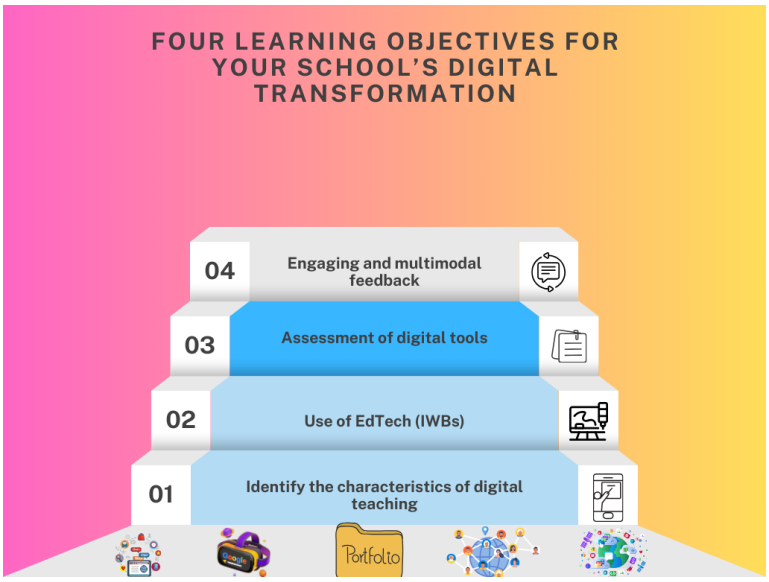


Figure 56: Stepwise visual representation of the four key learning objectives for digital transformation in schools used in Unit 3.1.1[36]

[Hypertext]

Assessment is fundamentally important for education and is the main tool allowing to evaluate student understanding and take decisions about a teacher's instructional practices. There are two main types of assessments: formative and summative. Formative assessment occurs during the learning process and provides ongoing feedback to students and teachers, allowing for adjustments in teaching strategies and student learning. Summative assessment evaluates student learning at the end of an instructional period, typically through exams or final projects, and is often used for grading purposes.

As schools increasingly adopt digital methods, assessments are also evolving. Digital assessments can offer real-time data, personalized feedback, and adaptive learning experiences, which not only enhance student engagement but also support a school's broader digital transformation goals. By integrating digital tools into assessment practices, schools can more effectively track student progress, streamline administrative tasks, and

[36] Source: Created by the graphic designer Lenora on Canva and adapted by author for this course; available at:https://www.canva.com/design/DAGN7pSf4uw/Oq2N1BrJVHW5EDphdxY51A/edit?utm_content=DAGN7pSf4uw&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

create a more dynamic and responsive educational environment. These principles are in line with what DigCompEdu suggests about forward looking educators who experiment with digital tools and how important is to use them in the assessment process.

In the presentation below, we have included information about assessment and how the integration of digital tools can improve this process and lead the way towards your school's digital transformation.

[Canva presentation]

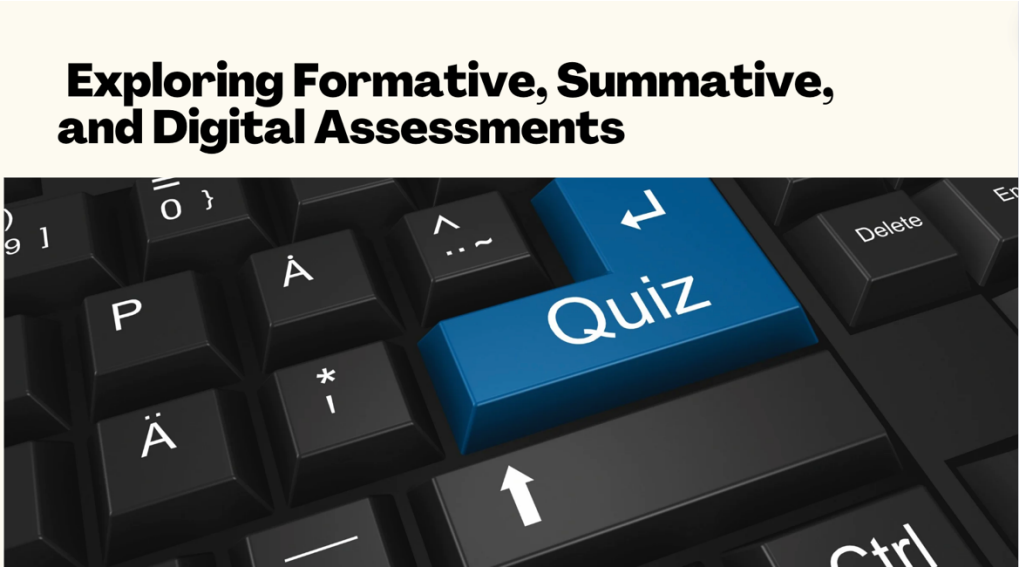


Figure 57: Previewing the presentation used in Unit 3.1.1[37]

[End_of_Page]

[37] Source: Created by the author on Canva and available at: https://www.canva.com/design/DAGNS-N-rdE/FuY_Cwg7L7S_9DmUndJ3dQ/edit?utm_content=DAGNS-N-rdE&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

[Hypertext]

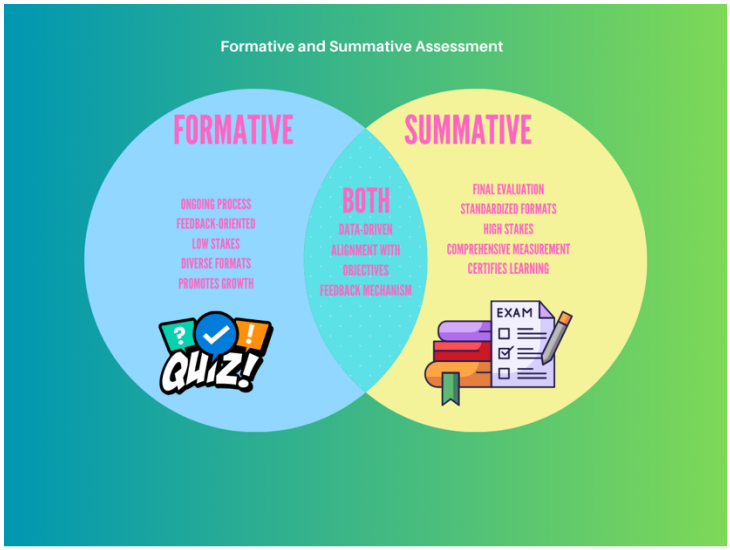


Figure 58: Image depicting the characteristics of formative and summative assessments[38]

In this Unit, we will demonstrate how you can use the popular tools Google Forms and Canva to create formative and summative assessments. There are several tools, paid and free, that favor only one type of assessment, however these tools are easily accessible, you can opt to use them for free and they can accommodate formative and summative assessments equally well. It only makes sense to prefer a tool that can be used for both, while you are trying to transfer your assessment in the digital space, master it and then see if it makes sense to adopt different tools for different purposes. This will allow you to feel confident and then explore more tools if you wish to do so. The use of digital tools like Google Forms especially, will certainly help educators to evaluate the knowledge and competencies of a large number of students, objectively and timely.

Using this type of applications allows you also to keep track of all the assessments you have created, preview and improve them, and share them with your colleagues. Google Forms is a versatile and user-friendly tool that supports many different types of question types like multiple choice and True or False. Canva is a tool that was initially popular with creative professionals and was fast adopted by teachers; schools all over the world provide an

[38] Source: Created by the author on Canva

active subscription so teachers can access as many templates as possible. Canva is great for assessing students because it allows them to showcase creativity through visual projects and supports diverse learning styles with its easy-to-use design tools. It also encourages collaboration and critical thinking.

Have a look at the video below and learn how to use Google Forms and Canva to create your own formative and summative assessments.

[Video]

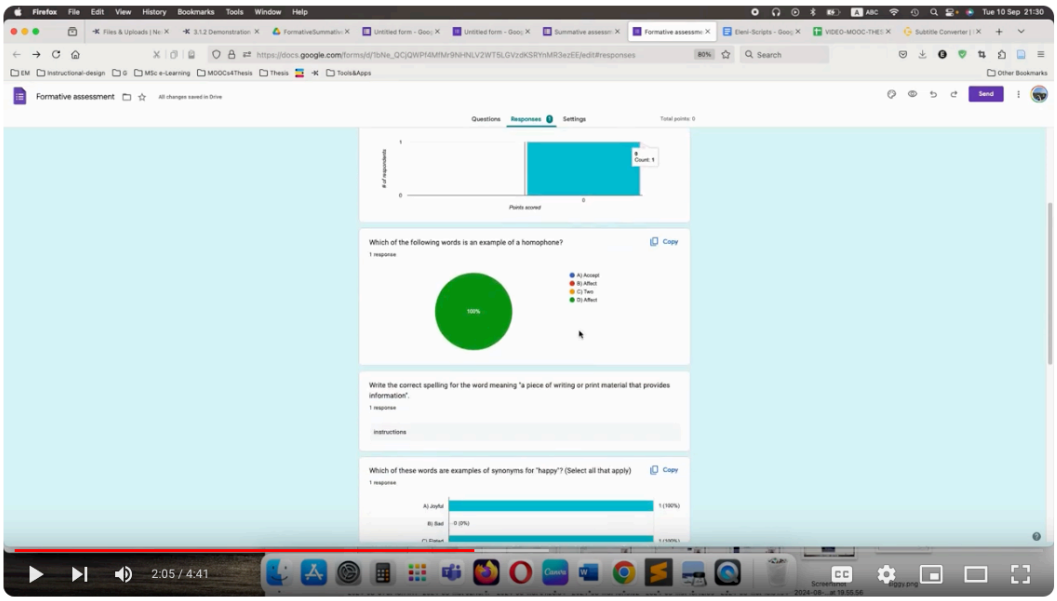


Figure 59: Preview of the video on assessment with online tools used in Unit 3.1.2[39]

[End_of_Page]

Act_ID# 3.1.3 Practice Unit 2.1 [Hypertext and Multiple Choice test on Quizlet]

[Hypertext]

In this practice Unit, we would like you to try out the below multiple-choice quiz and if your current knowledge and beliefs are aligned with what we have seen previously on the topic

[39] The video *Using Google Forms and Canva for Formative and Summative Assessment[4:42]* was created by the author and is available at: https://youtu.be/CNYT2kepfgw under license Available under license Attribution Non-Commercial No Derivatives

of formative and summative assessment methods. These quizzes are meant to help you understand the content of the Micro-MOOC and carry no weight towards your final grade!

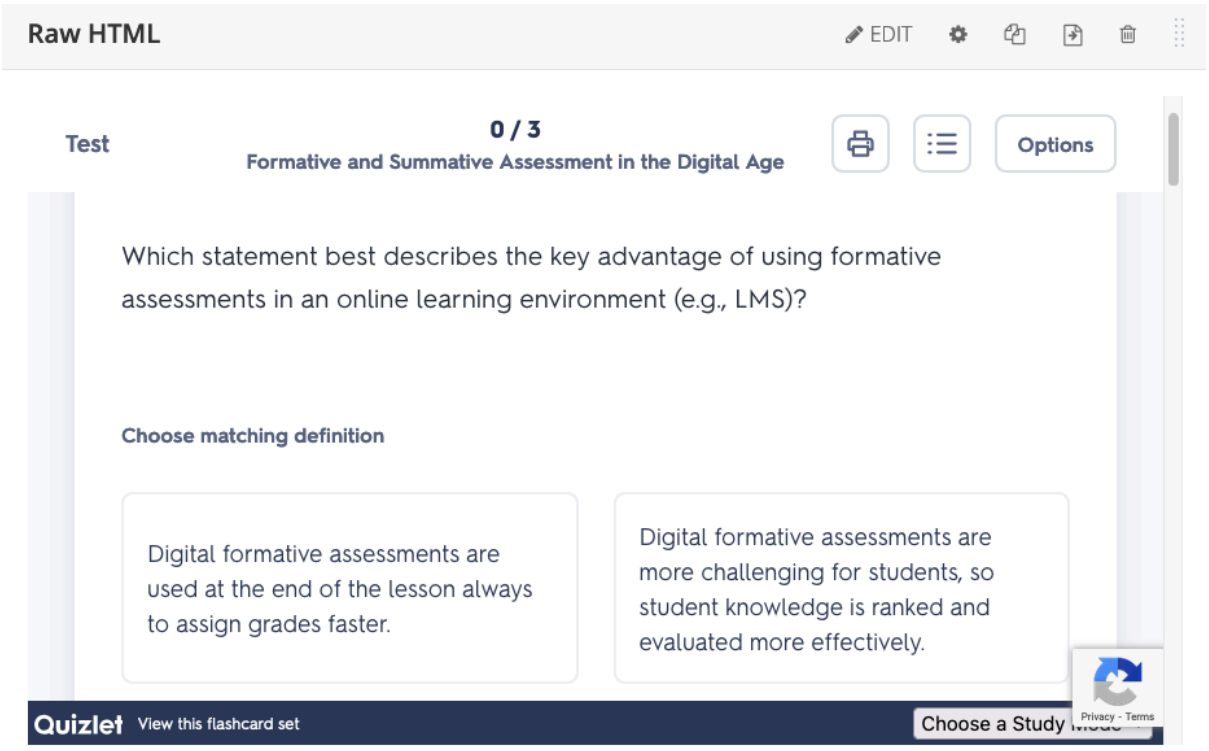


Figure 60: Assessment on Quizlet for Unit 3.1.3

Multiple choice quiz
Created on Quizlet by the author. Available here: https://studio.edunext.co/container/block-v1:next-gen-educators+NGE2024+2024-Autumn+type@vertical+block@f89dd917e6994ebcbda9f9818dfd5c86

[Multiple Choice – Quizlet]

1. Which statement best describes the key advantage of using formative assessments in an online learning environment (e.g., LMS)?

A)Digital formative assessments are used at the end of the lesson always to assign grades faster.

B) Digital formative assessments allow for real-time feedback and analytics reports which give some flexibility to teachers adjust their instruction.

C) Digital formative assessments reduce teacher involvement because the entire process is automated.

D) Digital formative assessments are more challenging for students, so student knowledge is ranked and evaluated more effectively.

2. Why is it considered that digital tools can enhance the effectiveness of summative assessments compared to traditional methods?

A) They limit the type of questions that can be asked to True/False making them less reliable for complex exams.
B) They are supposed to be used in low-stakes exams that carry no weight for the final assessment and grade, and they cannot be used as a final exam which is meant to be handwritten and in physical presence.
C) They allow for instant grading and an automated feedback process.
D) They are less reliable because a human didn't do the final grading.

3. How do interactive whiteboards enhance the effectiveness of digital formative and summative assessments in the classroom?

A) IWBs primarily serve as a display tool and don't impact the assessment process.
B) IWBs make assessments more complex as they present large chunks of text and many visuals so students cannot focus.
C) IWBs can be used only in remote, distance teaching and since the teacher cannot monitor the students, it shouldn't be considered at all for the assessment process.
D) IWBs can facilitate teachers conduct interactive and engaging assessment, using gamification and other visual elements, facilitating dialogue and engagement and reducing stress.

[Hypertext, image]

Bonus Task – Create your template at your own pace!

We have explored summative and formative assessment with the use of digital tools, but we haven't seen yet how you can assess your students understanding with visual assessment. After a task, you can consider asking from your students to assess their performance or interest using graphic design tools. This way not only you help them exercise their digital skills but you force them to think about their tasks. Let's say that they are asked to assess their performance in STEM classes where the majority is interested

about mathematics, a few about physics and only a couple about chemistry. You also observe that they were active during the first hour and the third, but not during the second hour. How would they organize and interpret this data? We have prepared an example for you below. Are you willing to try it already with your students? If not discuss with your peers in the forum about your doubts.

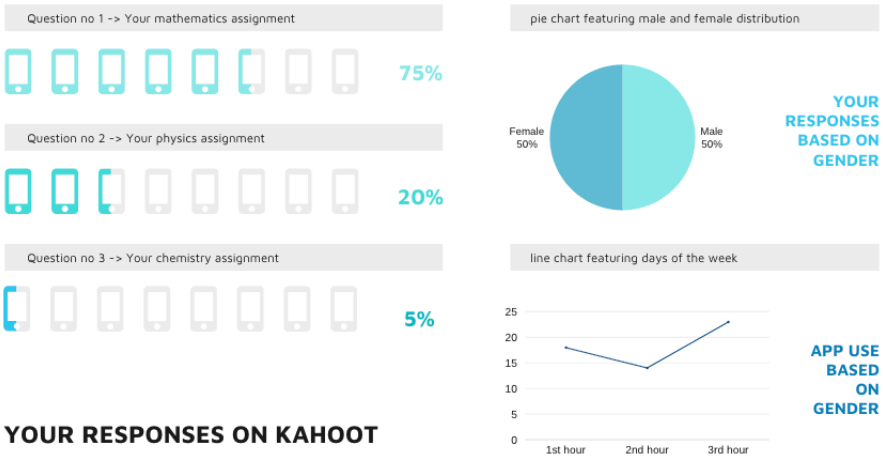


Figure 61: Example of worksheet for teachers used in Unit 3.1.3[40]

[End_of_Page]

Act_ID# 3.1.4 Self-evaluation Unit 2.1 [Hypertext, Drop Down Problem with Hints and Feedback]

[Hypertext]

In the following scenarios your knowledge and criticism on formative and summative assessment types will be evaluated. Take the opportunity to evaluate where you currently stand by choosing a response you consider correct; you may try again as many times as you wish and once you find the correct answer the explanation will be available to you. Your responses will not impact your final grade in any way.

[Drop Down Problem with Hints and Feedback]

[40] Source: the template was originally created by the Canva Creative Studio team and was adapted by the author. It is available at the author's account at: https://www.canva.com/design/DAGOTA67kSE/LcA3-SXIBWG2K3Y7fzzfGg/edit?utm_content=DAGOTA67kSE&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

Scenario 1: Konstantinos is a teacher or chemistry in junior high school and is delivering for the first time a lecture about the pH levels. He is teaching the first grade of junior high school and this is their first week of Chemistry, being introduced to basic concepts. While he wants to evaluate their understanding, he doesn't want them to focus on grades or be discouraged; still however, he needs to assess their understanding so far. He doesn't want to make a big deal out of this test so he assigns a quiz during class.

Question: Why did Konstantinos choose this type of assessment (the quiz) and didn't opt for a class presentation or an essay?

A) To assign grades that will count towards students' final evaluation for the semester in the subject of Chemistry.
B) To receive feedback that will help him adjust his teaching and pace of presenting new information to students.
C) It will make him feel confident to discuss with the school's Principal and address relevant questions about the students level already.
D) He wants to determine which students show an inclination towards STEM subjects.

Hints
First hint: The feedback Konstantinos will receive will help him adjust his teaching and pace, addressing any issues or misunderstandings promptly.
Second hint: The quiz is being used as a way of formative assessment and the information he will get will be sufficient without intimidating the students unnecessarily.
Third hint: Catering to students' needs promptly before moving on to more challenging concepts, is a characteristic of formative assessment.

Scenario 2: Ourania is a mathematics teacher who used several digital tools in her classroom. Most of the times she uses an online platform to create and assign quizzes to her students to receive instant feedback when the test is informal and carries no weight for the final grade. When she wants to conduct a formal test, she uses Google Forms because it allows for instant export of the results.

Question: How do these tools enhance her assessment process overall?

A) They don't facilitate the assessment process because it takes a lot of time to familiarize herself and her students with the tools.

B) She doesn't have to create materials for her lessons anymore, digital assessment automatically means use of digital platforms for everything.

C) They jeopardize the assessment process because it is easier for students to cheat.

D) They simplify the grading process ranking and categorizing the students' responses which saves a lot of time allowing her to focus on personalizing her instruction as much as possible.

Hints

First hint: Saving time during the grading process means more free time to create personalized instruction based on students' needs, addressing learning gaps.

Second hint: The use of digital tools occasionally or frequently doesn't mean they cannot be combined with other non-digital forms of assessment.

Third hint: These tools are upgraded frequently and are very safe in terms of data use; they are also reliable and allow teachers to mix questions so students don't receive them in the same order.

3.2 Multimodality in feedback

Act_ID# 3.2.1 Presentation Unit 2.2 [Image, Hypertext and Canva presentation]

[Image]

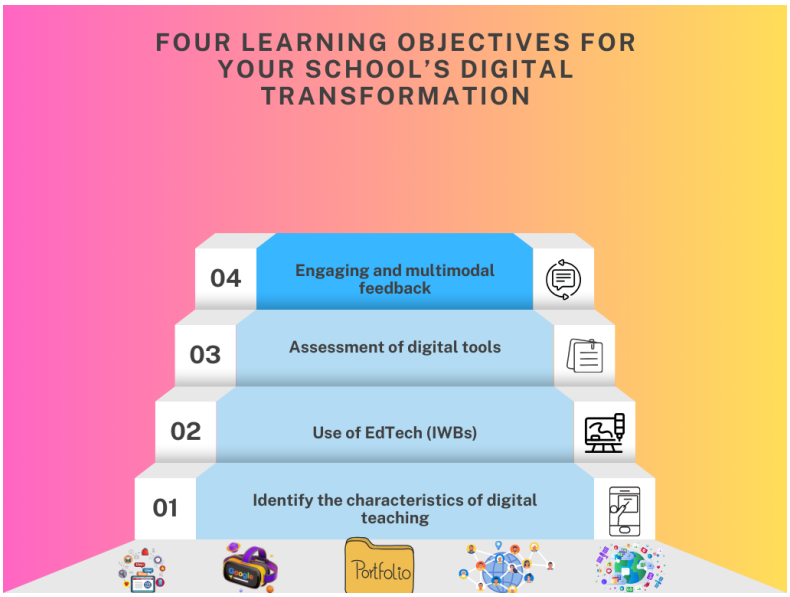


Figure 62: Stepwise visual representation of the four key learning objectives for digital transformation in schools used in Unit 3.2.1[41]

[Hypertext]

In this Unit, we are going to discuss about feedback and more specifically how you can use principles and characteristics of multimodality to make it more appealing, engaging and inspiring. We have identified feedback as one of the most important components to watch out while working towards your school's improvement collectively, and the use of digital technologies has been identified by DigCompEdu as one of the main competencies for educators under Key Competence Area 4 – Assessment. While seemingly a boring process, feedback is in fact an extremely important and transversal skill that transcends the scope of DigCompEdu and digital skills in general but finds a place in the area of communication as well.

[41] Source: Created by the graphic designer Lenora on Canva and adapted by author for this course; Available at:https://www.canva.com/design/DAGN7pSf4uw/Oq2N1BrJVHW5EDphdxY51A/edit?utm_content=DAGN7pSf4uw&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

Feedback allows to teachers elaborate and give useful insights as to how they evaluate students' performance altogether, and while it is not a metric in itself, it contains a lot of data that can be used as metrics eventually. Feedback has been traditionally linked to the reception of grades or any formal evaluation of competencies and it has been linked with anxiety, fear or unwillingness to participate. It shouldn't continue to be the static process where students receive a written paragraph describing their errors; if done correctly it can introduce for example new processes in your classroom such as peer-review which in itself exercises multiple competencies. It can also be qualitative, quantitative choosing to focus on different data for different purposes.

What is frequently if not always overlooked is that feedback is an extremely important form of communication. If you look at the ways corporations organize their structures and processes around feedback through dedicated departments conducting performance reviews you will see how important is the skill of conveying messages about one's evaluation constructively, based on evidence while maintaining a positive attitude during the process.

In this Unit, we are going to demonstrate how to add multimodality to your feedback, making it more interactive, engaging and fun for yourself and your students. By the term 'multi-modality' we mean all the different media that can be added in your feedback such as written comments, audio segments and even videos, all these formats that can appeal to different types of learners (auditory, visual, write and read learners). Evidence supports that multimodal feedback assists students develop critical skills in listening and reading, also enhancing their visual literacy skills. As kids, we all that teacher who gave out colorful stickers with short messages; we can agree at this point that even unconsciously our teachers engaged in some basic form of multimodality. Through the presentation and the activities next, you are going to feel a bit more confident to explore this topic as well!

[Canva presentation]

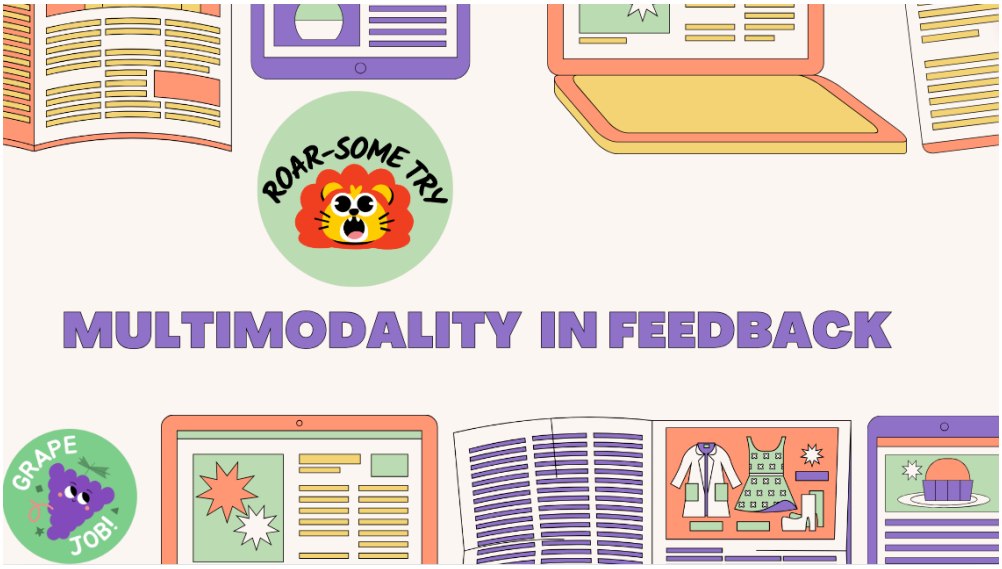


Figure 63: Previewing the presentation used in Unit 3.2.1[42]

[End_of_Page]

Act_ID# 3.2.2 Demonstration Unit 2.2 [Hypertext, video]

[Hypertext]

In our previous Unit we discussed about the importance of feedback and the necessity to transform this process to benefit students and teachers equally. In the presentation available to you, you can find some important conclusions about feedback and how digital tools and multimedia – or the practice of multimodality – can contribute towards this purpose.

In the video below we are sharing a demonstration on how to use Google Documents to provide multimedia feedback. In addition to the integrated features for comments and annotations, the video indicates two additional tools to consider, Mote and Screencastify, to record and embed audio and video segments. We strongly believe that while you are starting out to try new things for your practice, you need to experiment with solid and reputable tools. Google Classroom and Google Suite for example – but not exclusively –

[42] Source: Created by the author on Canva and available at: https://www.canva.com/design/DAGNwYK6MEg/H_vVc10z6PcACkoWCTb3Qg/edit?utm_content=DAGNwYK6MEg&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

offer many apps that complement each other and are easy to integrate and use individually. Likewise, Mote and Screencastify are well known applications used widely. Always make sure to read the Terms and Conditions of an application or software before you use it to record your students or upload personal information.

The key for success, not only in this course but in general when it comes to your practice, is to improve already existing procedures. Similarly, once you have a tool at your disposal, you need to make sure you are making the most out of their use. In our case, we are exploring feedback and how to make the process accessible and engaging. As a next step we have identified Google Docs as a great option of a tool to use in this process. This brings us to a new trend, for which many articles and even MOOCs have been produced, the HyperDoc[43].

[Video]

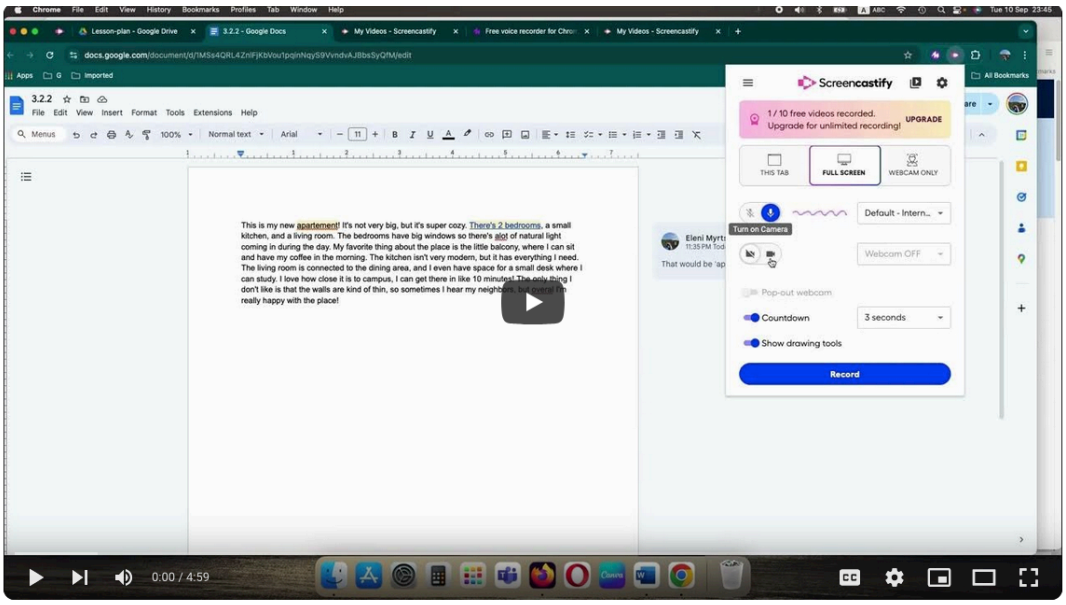


Figure 64: Preview of the video on multimedia feedback used in Unit 3.2.2[44]

[End_of_Page]

[43] https://www.edutopia.org/article/how-hyperdocs-can-make-schoolwork-more-student-friendly/

[44] The video Using digital tools for multimedia feedback [5:00]
was created by the author and is available at: https://www.youtube.com/watch?v=skv_RVs9kF4
under license Attribution Non-Commercial No Derivatives

Act_ID# 3.2.3 Practice Unit 2.2 [Hypertext, Quizlet, Preceden Interactive Timeline]

[Hypertext]

In this practice Unit, we would like you to try out the below Match and Answer game choosing the pairs and evaluate if your current knowledge and beliefs are aligned with what we have seen previously on the topic of multimodality in feedback. These quizzes are meant to help you understand the content of the Micro-MOOC and carry no weight towards your final grade!

[Quizlet]

1. Multimodal feedback involves using different communication methods. Match with: Combines text, audio, video, and visual aids to enhance understanding.
2. Multimodal feedback caters to various learning styles. Match with: Engages multiple senses, making feedback more personalized and effective.
3. A teacher provides written feedback and records a video explanation. Match with: This is an example of multimodal feedback in action.
4. Multimodal feedback helps students retain information better. Match with: By using different formats, it increases comprehension and engagement.

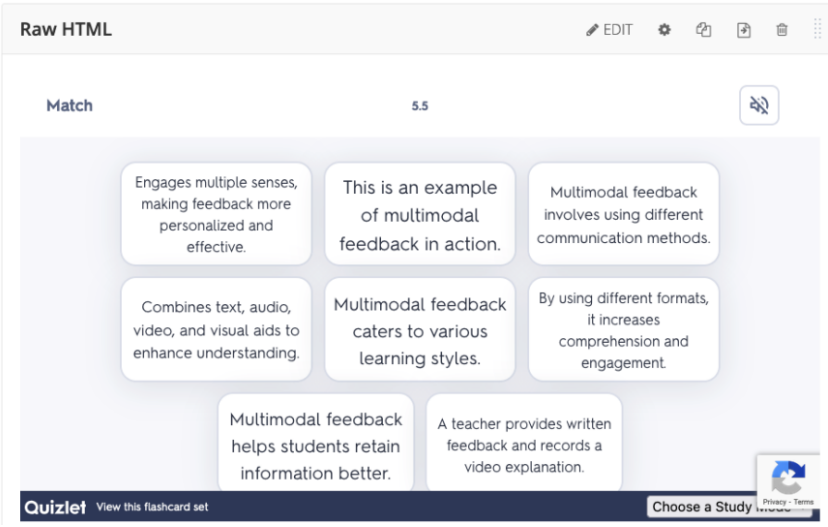
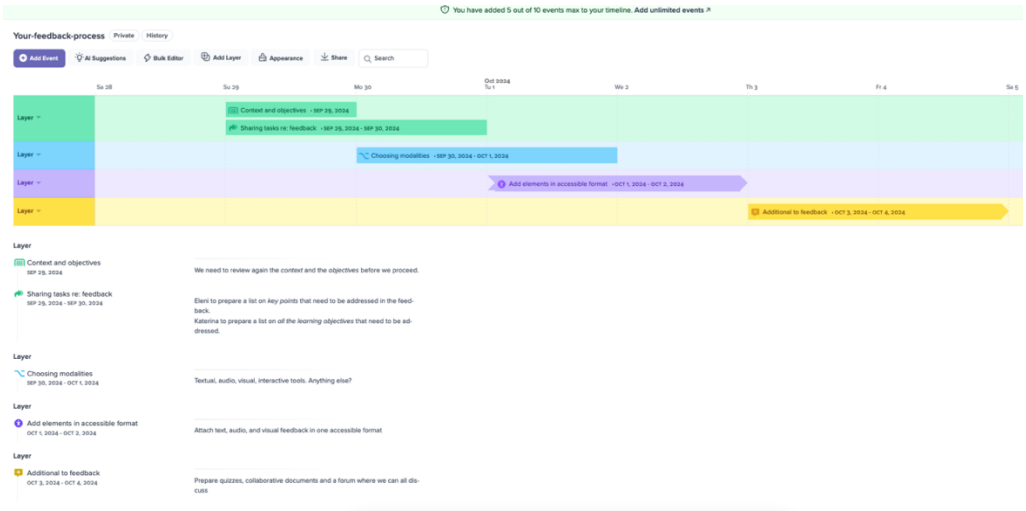


Figure 65: Assessment on Quizlet for Unit 3.2.3[45]

Bonus Task – Create your template at your own pace!

You have implemented a STEAM project with the collaboration of a colleague, a Humanities or STEM subject teacher (you can assume either role). Now, you need to grade the projects developed by students and you have only a week. You are working remotely so you are sharing the interactive timeline with your colleague adding the necessary steps to take before you begin the process. Edit the timeline on Preceden as needed, adding as many layers and events as you wish. This exercise will help you contextualize and visualize the steps that you need to plan before preparing and giving your feedback.

[Interactive timeline]



[45] Source: Screenshot by the author directly from studio.edunext.co. Flashcards memory game created by the author on Quizlet and available here: https://quizlet.com/gr/939103220/multimodal-feedback-flash-cards/

Figure 66: Example of activity for learners demonstrating an interactive timeline used in Unit 3.2.3[46]

Once you create your first project, you are requested to visit the forum area and interact with your peers. Please respond to the questions below.

1. Which modes of feedback (audio, video, traditionally used text) will mostly reason with and be accepted by your students specifically and why is that?
2. If you are not familiar with multimodality in documents including feedback, how are you going to explore the topic and through which resources? Do you think it will make a difference and contribute towards the learning culture at your school?

[End_of_Page]

Act_ID# 3.2.4 Self-evaluation Unit 2.2 [Hypertext, Drop Down Problem with Hints and Feedback]

[Hypertext]

In the scenarios below, your knowledge and beliefs on feedback, communication strategies and multimodality will be evaluated. Take the opportunity to evaluate where you currently stand by choosing a response you consider correct; you may try again as many times as you wish and once you find the correct answer the explanation will be available to you. Your responses will not impact your final grade in any way.

[Hypertext, Drop-down problem with Hints and Feedback]

Scenario 1: John, an English teacher in the second grade of junior high school, is assessing his students' essays on argumentative writing. He can clearly see that his students struggle to structure their thoughts and articulate what they want to say maintaining a good structure, although they have excellent ideas that can support the topic. To help them improve and not intimidate them, he decides to implement multimodal feedback.

Question: Which method of providing multimodal feedback would be the most effective in helping students understand and improve their essay structure?

[46] The template was originally created by the author on Preceden and is available at: https://www.preceden.com/timelines/1157566-your-feedback-process

A) Writing elaborate and long comments in the margins of the essays pointing out with the processor's bright yellow highlighter function where the structure is weak.
B) Recording an audio file explaining the common structural issues found in the essays and how to fix them.
C) He creates a video tutorial that demonstrates how to outline an essay, using specific examples of his students' essays to better illustrate his examples.
D) He highlights and color codes sections of the essays to indicate the introduction, body, and conclusion including brief notes on what each section should include.

Hints

First hint: The main point of using multimedia is to avoid excessive text.
Second hint: Providing examples is always a good way to demonstrate and provide explanation.
Third hint: Highlighting text without using audio or video isn't considered as use of multimedia.

Scenario 2: Anastasia, a history teacher in high school, is trying to evaluate a project done by a group of students on the topic of Renaissance. The project will be highly graded in terms of accuracy and presentation but she still needs to provide feedback that will help them maintain the high-quality work for future projects and improve a few aspects even more.

Question: Which approach will be best for her students while using multimodal feedback in enhancing both content related and presentation skills?

A) Holding a live session in class where she provides feedback verbally, allowing for questions which she responds to instantly.
B) Sending an email with bullet points and annotations clarifying her thoughts as needed.
C) Recording a video critique where she analyzes the content and structure of each slide, explaining in detail what has worked and what can be improved.
D) Writing a detailed summary at the end of their project report, outlining the strengths and areas for improvement.

Hints

First hint: The use of screen recording tools so students can follow what the teacher is doing is great assistance for them.

Second hint: A written summary without any interaction no matter how detailed is not considered multimedia.

Third hint: A live session like a webinar even if it is for feedback purposes is not personalized and cannot be considered multimedia feedback it is less clear and not as impactful.

[End_of_Page]

3.3 Recap and self-assessment

Act_ID#3.3.1 Micro-MOOC 2 recap [Hypertext]

[Hypertext]

In the second Micro-MOOC we learned about:

- Key Competence Area 4 Assessment (the difference between formative and summative assessment, feedback and how to use technology to improve both processes).
- What are the characteristics and examples of summative and formative assessment.
- What is multimodal feedback, its benefits and characteristics, in what context it can be used.

We also saw:

- Examples of tools and activities that can be used for digital assessment and multimodal feedback.
- Through the scenarios we examined how teachers can navigate among the different options of assessment and feedback and how to improve them.
- How processes that we use every day at school can be improved to exercise students skills in general and how they are linked with communication.

[End_of_Page]

Act_ID#3.3.2 Open Response Assessment Assignment: Report

[Open Response Assessment]

The rationale

Capacity building programs for teachers may focus on enabling teachers acquire more competencies and skills, but the end beneficiaries are always the students. This is why this type of programs focus on methodologies, teaching strategies and tools. We are constantly witnessing that these programs lately shift from focusing only on hard skills but link every procedure such as assessment and feedback with soft skills like critical thinking, communication, establishing constructive relationships between students and teachers.

The task

You are going to be evaluated by external evaluators coming to your school. They will ask you about student performance, assessment and feedback, which strategies you implemented for these two processes, what are the take-away messages at the end of the semester and how your students responded.

Useful tips

- Prior to the evaluation in person, you need to submit a written report of at least 400 words covering all the criteria.
- You need to mention how you helped improve the processes of assessment and feedback.
- You need to indicate how these adjustments are contributing towards your school's overall digital transformation.

Brief description of the criteria

- I understood and described in detail principles about digital assessment (formative and summative).
- I gave an elaborate description on how I have introduced my students to multimodal feedback and how we work with it now.
- I mentioned how these re-introduced processes contribute to critical thinking.
- I managed to deliver a coherent, clear, organized and error-free report.

Table 12: Rubric used in the Open Response Assessment in micro-MOOC 2

Criteria	Needs Improvement (1 point)	Satisfactory (2 points)	Proficient (3 points)	Exemplary (4 points)
Understanding of Digital Assessment	My report isn't detailed and reflects my limited or inaccurate understanding of formative and summative assessments. It lacks completely relevant examples of digital tools that can be used.	My report defines formative and summative assessments with some analysis of digital tools, but examples may be limited or not fully relevant.	In my report I differentiate between formative and summative assessments with relevant analysis of digital tools that can be used and I provided clear examples.	My report clearly distinguishes formative and summative assessments with in-depth analysis of digital tools that effectively support both. Provides innovative examples.
Integration of Multimodal Feedback	The report fails to adequately describe or connect multimodal feedback to digital tools or diverse learning needs.	My report mentions multimodal feedback strategies but with limited examples or connection to diverse learning needs.	My report describes effective strategies for multimodal feedback with relevant examples and discusses the benefits for diverse learners.	My report provides comprehensive strategies for implementing multimodal feedback using digital tools, with strong examples; in addition, it explains in detail how diverse learners are supported.
Reflection and Critical Thinking	There is limited reflection or critical analysis in my report, the response may be mostly descriptive, with little personal insight or engagement with the topic.	The report provides some reflection but lacks depth or critical analysis, some personal insights have been included but may be minimal or superficial.	My report shows solid reflection and analysis of digital assessments and multimodal feedback, offering some personal insights.	My report demonstrates deep reflection on the role of digital assessments and multimodal feedback in education, it also provides critical analysis and personal insights.
Clarity and Organization	My report is poorly organized, with unclear ideas and significant issues in grammar or clarity.	My report has a basic structure, but some ideas may be disjointed or	My report is organized, with a clear structure and logical flow. My writing is	My report is well-organized, with clear and logical structure. My writing is precise, with strong

Criteria	Needs Improvement (1 point)	Satisfactory (2 points)	Proficient (3 points)	Exemplary (4 points)
		unclear. There are a few grammar issues.	generally clear, with some minor issues.	transitions between ideas.

Criteria prompts:

- Demonstrate your understanding of different types of assessment.
- Demonstrate your understanding of multimodal feedback by guiding others.
- Demonstrate your deep understanding of assessment and feedback as processes.
- What are the things you need to consider before drafting a report in terms of structure and content?

[End_of_Page]

Act_ID 3.3.3 Self-evaluation Checklist: I can… [Hypertext, Poll, Word cloud – Quizizz, W3Schools, Get Bootstrap, Imgbb]

[Hypertext]

The purpose of this checklist is for you to determine whether you feel confident dealing with issues discussed in this unit. You might find it useful in detecting whether you need additional study or support; in the next Unit you will have the opportunity to discuss these topics with your peers at the forum area and in the final Unit we will provide an indicative list of resources for you to consider.

[Poll]

1. I can refer to Key Area of Competencies 4 Assessment of DigCompEdu and explain briefly why summative and formative assessment, in addition to feedback are included and how the use of digital tools can improve these processes.

- No, I cannot.
- Potentially with some assistance.
- I can confidently do that.

2. I know how to use one tool for summative and formative assessment well, and I am exploring more options.

- No, I cannot.
- Yes, I can do that with some assistance.
- I consider myself tech savvy and I have been experimenting with multiple tools.

3. I can link various learner types to the respective feedback they should receive especially in terms of content and media used.

- No, I cannot.
- Yes, I can with some assistance.
- Yes, I have been experimenting with the way I deliver my feedback and can use multiple tools for this purpose confidently.

[Word Cloud – Quizizz]

What was the most useful thing you learned in this Micro-MOOC? Let us know in the word cloud and come back to see what other course participants mentioned!

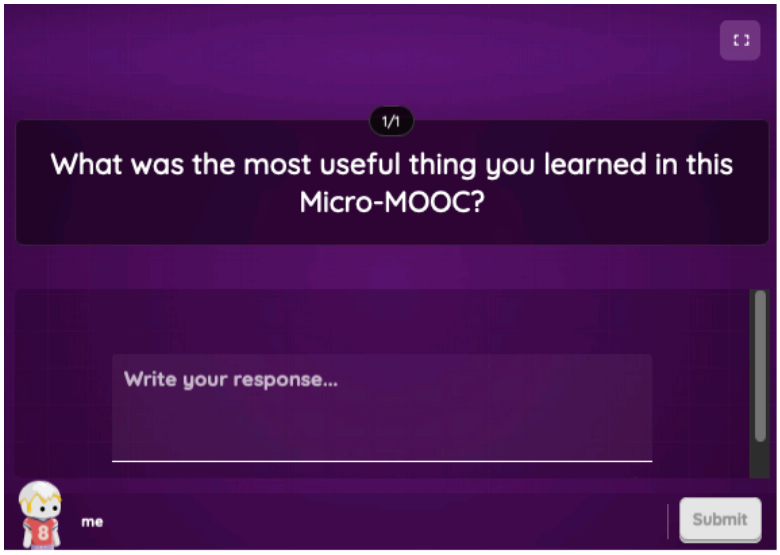


Figure 67: Preview of Quizizz used for feedback purposes in Unit 3.3.3[47]

[47] Source: Screenshot by the author, the assessment was created by the author on Quizizz and is available at: https://quizizz.com/admin/quiz/66d1cb57637e5e72db1f875a?searchLocale=

[W3Schools]

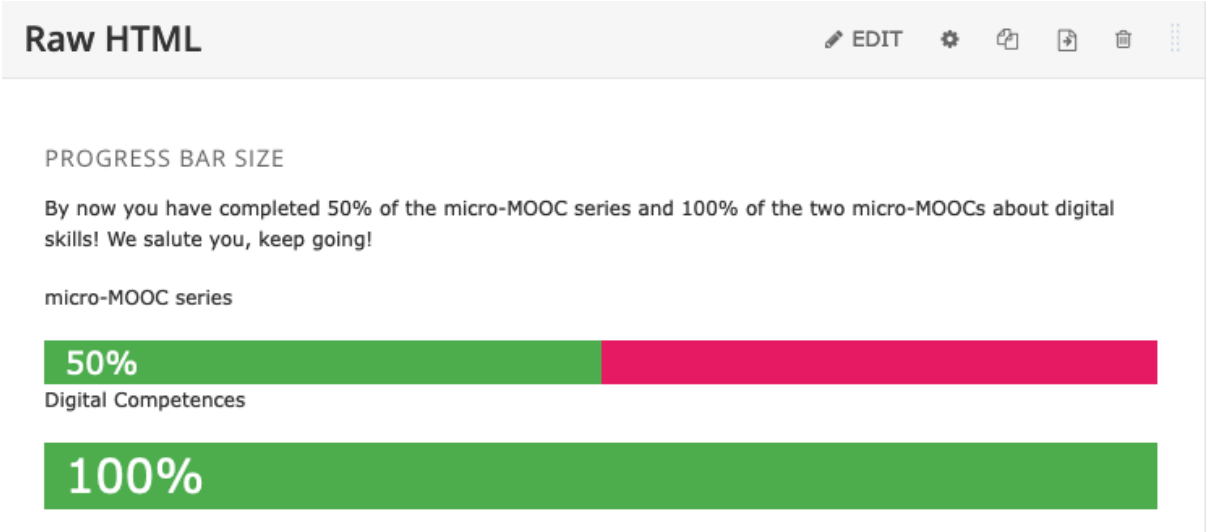


Figure 68: Image depicting the open-source tool W3Schools and the progress bar in Unit 3.3.3[48]

[Get Bootstrap – Badge]

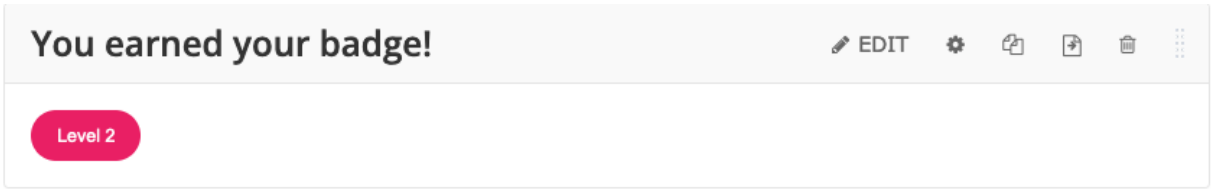


Figure 69: Image depicting the Level badge for Unit 3.3.3[49]

[48] Progress bar with positive reinforcement message to help participants track their progress in the course. Created by the author directly on Edunext with customized HTML code found on the open-source website W3Schools. The respective category is available here: https://www.w3schools.com/w3css/w3css_progressbar.asp

[49] Created by the author directly on Edunext with customized HTML code found on the open-source website Get Bootstrap. The respective category is available here: https://getbootstrap.com/docs/4.0/components/badge/

[Canva and Imgbb]

Figure 70: Image depicting the accomplishment badge created on Canva and generated on Imgbb for Unit 3.3.3[50]

[End_of_Page]

Act_ID#3.3.4 [Discussion Forum, Image]

[Hypertext]

Through the various tasks and materials in this Micro-MOOC, we wanted to inspire you to think outside the box about certain processes that you implement at your school, and we also emphasized on how assessment and feedback are linked with communication tools.

We would like to encourage you now to visit the forum area and discuss with your peers about how you can take it to the next level, after learning how to use digital tools for these two processes specifically. Have you ever considered that you can create an entire portfolio of materials guiding your students and making them aware of their emotions in order to make them more resilient through the feedback they receive? What precedes your feedback?

1) Discuss with your peers about the use of emotional intelligence templates where students will be evaluated through their responses. For example, in a lesson about war conflict how would you evaluate a student's essay so your feedback reflects their emotional response, empathy and readiness?

[50] Designed by the author on Canva and embedded on Edunext with an HTML code generated on https://imgbb.com/
Available at: https://www.canva.com/design/DAGRmeEgjqk/F-yWlGH-BhgTrMx6gWpehA/edit?utm_content=DAGRmeEgjqk&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

2) Discuss with your peers how would you assist and support academically weaker students that need to work in groups but don't perform well during teamwork. How can your feedback, with the use of multimedia, approach them and encourage them? How could other students help and guide them?

[Image]

Figure 71: Example of infographic for learners[51]

[End_of_Page]

[51] Source: Created by the graphic designer Sevcan Barut on Canva and adapted by the author of this course. It is available at creator's account at :https://www.canva.com/design/DAGN8Ioai84/2_BNe2f33Y2zWUWa8oQsIA/edit?utm_content=DAGN8Ioai84&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

3.4 Additional study material

Act_ID#3.4.1[Recommendations for further learning]

- Akoto, M. (2021). Collaborative Multimodal Writing via Google Docs: Perceptions of French FL Learners. *Languages*, 6, 140. https://doi.org/10.3390/languages6030140
- Joint Research Centre: Institute for Prospective Technological Studies, Devine, J., Punie, Y. and Kampylis, P., (2015). *Promoting effective digital-age learning – A European framework for digitally-competent educational organisations*, Publications Office. https://data.europa.eu/doi/10.2791/54070
- Kolb, L. (2021, June 29). *How HyperDocs Can Make Schoolwork More Student Friendly*. Edutopia. https://www.edutopia.org/article/how-hyperdocs-can-make-schoolwork-more-student-friendly/ Retrieved August 13, 2024, from https://www.edutopia.org/article/how-hyperdocs-can-make-schoolwork-more-student-friendly/

[End_of_Page]
[End_of_Topic]

Day 4: Micro-MOOC 3 – Creating value through resources and people (3 hours)

4.0 Introduction

Act_ID#4.0.1 Learning objectives [Hypertext and Google Forms - Poll]

[Hypertext]

Following the successful attendance of this Micro-MOOC, you will be familiar with European Union's Entrepreneurship Competence Framework (EntreComp) and more specifically Key Area 2 about Resources in terms of using material support and teambuilding. These goals correspond to the Intermediate level of competence, and the stage of Experiment Level 3, which is the respective B1 level in other competence frameworks. More specifically:

- You will be able to evaluate and utilize the different resources at your disposal to maximize their impact
- You will be able to form and coordinate a team ensuring that everyone works collaboratively towards a common entrepreneurship project

We would like you to respond to a few questions below self-evaluating your previous experience, knowledge or attitudes. You may come back to the poll if you wish to see what

other participants have responded and potentially initiate a discussion in the forum area. These responses will not affect your final grade.

[Google Forms - Poll]

Poll 1: When you design a project for your students, typically outside the classroom, what is the biggest challenge when planning the resources to be used?

- I have a hard time selecting resources and materials for complex, interdisciplinary projects (e.g., STEAM).
- My biggest concern is to decide which resources are the most important.
- My school has several resources for various projects, but I don't know how to allocate them efficiently.
- I can plan a one-time project, but I have trouble monitoring resource usage over time continuously, and therefore avoid long-term projects, with long-term goals.

Poll 2: When splitting your students into teams, what do you consider as the key to successful collaboration?

- Clear communication among team members
- Delegating tasks appropriately according to students' strengths and inclination
- Setting a few common goals
- Team building sessions to establish trust

Poll 3: Which resource found in schools typically is not as used as it could for entrepreneurship projects and education?

- Technology, tools and hardware
- Using the network found in the wider community (e.g., supporting pedagogical staff, parents, local businesses)
- Financial resources
- Human resources (the students and teachers themselves)

[End_of_Page]

4.1 Planning and mobilization of resources

Act_ID#4.1.1 Presentation Unit 3.1

Figure 72: Stepwise visual representation of the four key learning objectives for developing entrepreneurial skills in schools used in Unit 4.1.1[52]

In our previous Micro-MOOCs we have covered topics about digital skills for teachers and students and how they can contribute towards a change of practice, leading eventually to school transformation. We chose to focus on a few selected areas identified by European Framework for the Digital Competence of Educators (DigCompEdu) as Key Competence Areas.

In our next Micro-MOOCs we are going to discuss about entrepreneurship, stepping on a different and equally important framework, EntreComp: The Entrepreneurship Competence Framework. One of the aims of this framework is for it to be adopted and applied in education in addition to everyday life and work contexts.

This brings us to the point of reflection as to why entrepreneurship is not currently integrated into the school curriculum as an individual subject, or at least in the context of

[52] Source: Created by the graphic designer Lenora on Canva and adapted by author for this course; available at: https://www.canva.com/design/DAGN7JWv3eQ/fCiqDCcYH4y5nLR7emOsfw/edit

multiple school subjects and especially STEM subjects where case studies could be examined. The reality is that entrepreneurship has been overlooked in schools because it is considered abstract, it doesn't fit in one subject exclusively content-wise but also because schools at the moment are very much oriented towards academic achievement, grades, standardized testing – we previously discussed about how assessment and feedback can change to better reflect students' needs – neglecting this way actual skills needed in society and the workplace. Which is very important at the moment in Europe, following over a decade of economic recession and lagging behind in education.

Only recently competitions for K-12 schools from non-profit organizations like JA Europe have started to engage students in the process, with more and more schools investing in FabLabs or designated creators' spaces, while we see how Universities today invest and fund through projects start-up incubators for their academic community (e.g., the WALK incubator by the Aristotle University and the Teen Business School initiative by the University of Macedonia in Thessaloniki).

All the above comes down to two conclusions. Initially, as we mentioned, entrepreneurship is not integrated in the official curriculum in most countries with a few exceptions trying to include it now. Next, there are no qualified teachers or educational materials and resources at their disposal to teach it in a coherent way, progressively becoming more demanding in terms of content, activities and evaluation. Implementing entrepreneurship education requires resources that the vast majority of schools cannot access.

In the introduction of the course, we included a brief video presentation of what is EntreComp. In the presentation below, we have included information and more details as to how we define what are the resources for entrepreneurship projects, how they are categorized and how can we get them.

Figure 73: Previewing the presentation used in Unit 4.1.1[53]

[End_of_Page]

Act_ID#4.1.2 Demonstration Unit 3.1 [Hypertext, video]

[Hypertext]

In this Unit, for our demonstration video, we have included a talk by Tina Seelig, the Executive Director of Stanford Technology Ventures Program, where she is reflecting on her experience with a previous classroom experiment. Together with her team, they had the opportunity to interact with students and gave them all the prompts and incentives to reflect on the creation of a new product or service. They noticed that it all came down to one thing: looking at their local community, while they also identified that the real advantage wasn't the capital they had at their disposal or even their final idea but pitching this idea which is the topic we will examine soon in a next Unit.

Listen to her talk and reflect about your practice: are students today making the most of their resources and opportunities in their surrounding? Are they exposed to entrepreneurial thinking often or any at all, what tools are they given at school to experiment with creative, entrepreneurial thinking?

[53] Source: Created by the author on Canva and available at: https://www.canva.com/design/DAGN79cHboA/rn3YzvkLvq84J1R1Bu5MVw/edit

[Video]

Figure 74: Preview of the video on classroom activities about entrepreneurship used in Unit 4.1.2[54]

[End_of_Page]

Act_ID#4.1.3 Practice Unit 3.1 [Hypertext, Quizlet, Coggle, Miro]

[Hypertext]

In this practice Unit, we would like you to try out the interactive quiz below. In our first Unit we mentioned FabLabs and how they gradually become more popular. Imagine that you are asked to introduce the idea of a FabLab to your colleagues. You would need a mind map first to introduce the concept to your colleagues, and we provide an elaborate example below in case you need hints. Before that, try out the interactive flashcards game and match each statement to an example of application until you memorize and start distinguishing the different concepts.

[54] Tina Seelig: Classroom Experiments in Entrepreneurship [6:11]
Source on YouTube: https://www.youtube.com/watch?v=VVgIX0s1wY8
This video is free to reuse under Creative Commons Attribution license (reuse allowed).

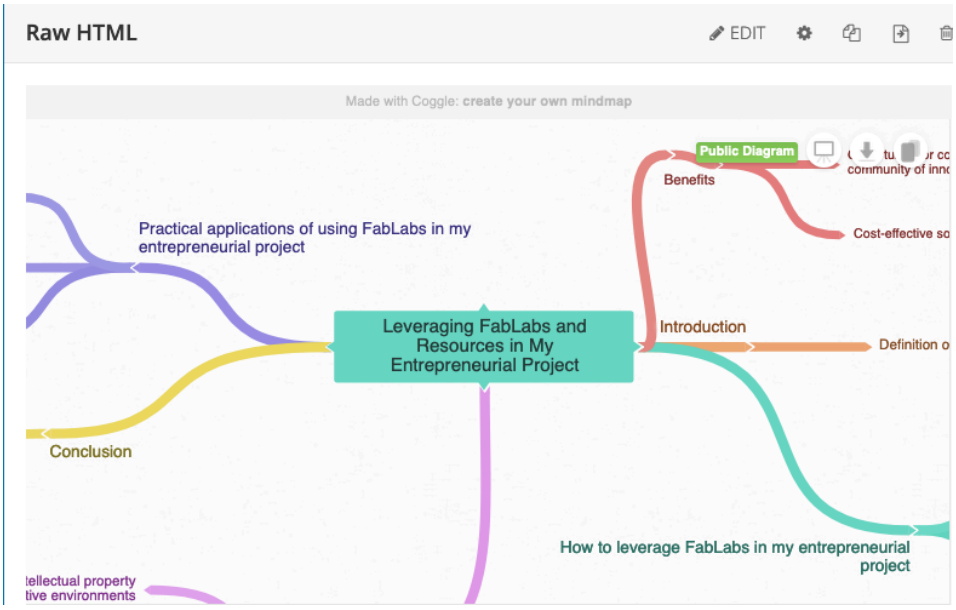


Figure 75: image depicting an interactive mind-map[55]

[Quizlet – Flashcards Quiz mode]

1. **Benefits of having a FabLab at school** - Opportunity for collaborative learning and idea sharing with a community of innovators
2. **How to leverage FabLabs in my entrepreneurial project** - Building partnerships and networking with FabLab communities
3. **Challenges and considerations when leveraging FabLabs in my entrepreneurial project** - Limited availability of certain advanced technologies in some FabLabs
4. **Practical applications of using FabLabs in my entrepreneurial project** - Prototyping and testing product ideas using 3D printing and digital fabrication

[55] Created by the author of Coggle and available here: https://coggle.it/diagram/ZtZLljbVpak0MR1c/t/leveraging-fablabs-and-resources-my-entrepreneurial-project

[Quizlet]

Figure 76: Assessment on Quizlet for Unit 4.1.3[56]

[Hypertext, image]

Bonus Task – Create your template at your own pace!

After the quiz, take some time and consider creating a resource inventory template using the Miro tool. We have included an example for you below and it is a great addition to your personal portfolio of materials and templates, that you can share, save on your Drive and invite others to edit. It is a very useful way to make a first assessment of what resources you already have in school, and understand what needs to be done (e.g., enroll your students in a programming course online, purchase hardware, etc.). When you are done, you can go to the forum area, create a thread to share your template with your peers an exchange opinions as to what needs to be included in the template. A template will help you organize your thoughts, systematically re-assess what your needs are and monitor spending better. There are many tools for you to consider, easily editable and shareable.

[56] Source: Screenshot by the author directly from studio.edunext.co. Flashcards memory game created by the author on Quizlet and available here: https://quizlet.com/gr/938688923/leveraging-fablabs-and-resources-in-my-entrepreneurial-project-flash-cards/?funnelUUID=94d07fb6-88fa-4c81-ae23-ff2e8dfa9909

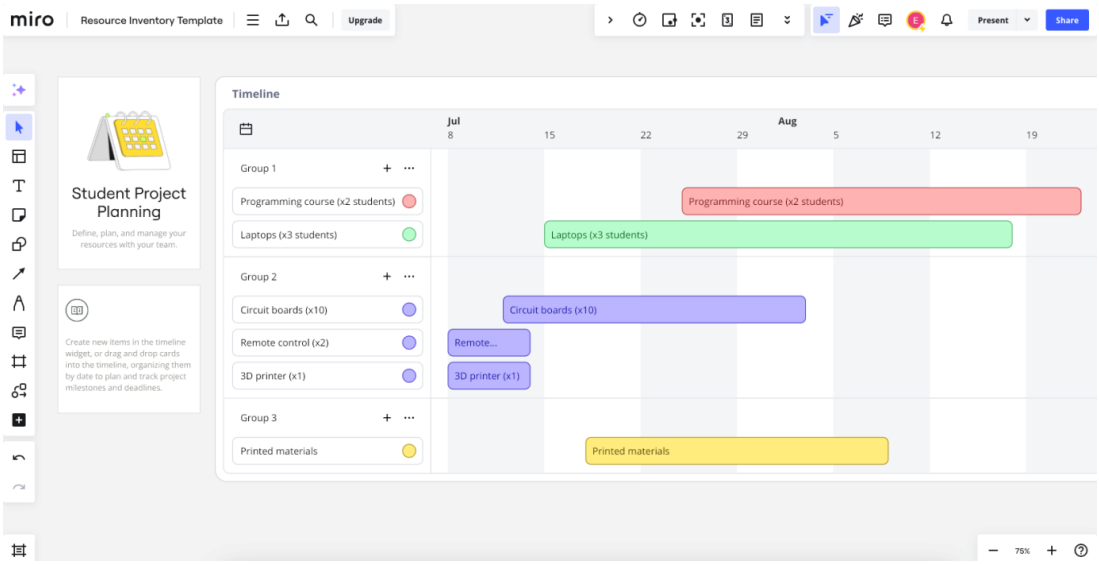


Figure 77: Example of a resource inventory template for teachers and schools[57]

[End_of_Page]

Act_ID#4.1.4 Self-evaluation Unit 3.1 [Hypertext, Drop Down Problem with Hints and Feedback]

[Hypertext]

In the scenarios below your knowledge and attitudes about resource management will be evaluated. Take the opportunity to evaluate where you currently stand by choosing a response you consider correct; you may try again as many times as you wish and once you find the correct answer the explanation will be available to you. Your responses will not impact your final grade in any way.

[Drop Down Problem with Hints and Feedback]

Scenario 1: Antonia is the leader of a student entrepreneurship team at your school. They have decided to launch a school-based sustainable line of domestic items such as cutlery (spoons and forks) from recycled products. The team is keen on working on the materialization of this idea but lack the tangible and non-tangible resources.

The school can financially support them although the budget to be allocated is small. Therefore, you as their teacher need to find a potential list of suppliers of these materials

[57] The template was originally created by the author on Miro and is available at: https://miro.com/welcomeonboard/ZlJCZEpteGxrdGpBOGV5elF4M01ydks2NmF6bk1POTN4S1h3RGthNmU5R3JNb2lSRFpGZDhVbkcyYTM5MURjMnwzNDU4NzY0NTk3MjI5ODg5Mjc1fDI=?share_link_id=338048533881

and a mentor who specializes in recycled items. You need to identify which resources you need and how to get them.

Question: Which approach would be most effective to address the gaps in the plan and help Antonia's team find the resources they need to launch their sustainable product line so it can reflect the Connectivism learning theory?

A) Focus on individual research and assign each team member to find suppliers and mentors independently.

B) Leverage the school's online networks and social platforms to connect with suppliers, experts, and potential mentors in the sustainability space.

C) Organize a local fundraiser to increase the team's budget and find resources through traditional fundraising efforts.

D) Delay the project until the team can find all the necessary resources on their own.

Hints

First hint: Individual research limits the potential connections and resources that a digital network approach could provide.

Second hint: Delaying the project would halt progress and miss opportunities to find resources through available networks.

Third hint: Connectivism emphasizes using digital networks to access information, expertise, and resources from a broad range of sources.

Scenario 2: After consideration, Apostolia's school is finally taking a step forward and participates in a competition for student entrepreneurs. They are working on a tech start-up idea, a time-management application. The team consists of a programmer for the development of the application, a designer and a manager to handle the administrative issues and they are part of a mentorship program. The team's main goal is to attract more talent to join them, there is a small budget available, but they are debating whether they

should use it to build the application (by buying more services and courses) or hire a communications professional to work on a marketing and dissemination plan.

Question: How can Apostolia's team prioritize in order to maximize the use of their limited funds and attract more talent to their tech start-up and be compatible with the Connectivism learning theory?

A) Use the budget to purchase additional development services and courses to enhance the application's technical features.

B) Focus on building the application without any outside help and rely on the team's current skills.

C) Hire a communications professional with the available budget to focus on marketing and dissemination.

D) Use online platforms and professional networks to find free or low-cost resources, talent, and marketing opportunities, instead of immediately hiring a communications professional.

Hints

First hint: Technical development alone may not directly help them attract more talent or market their product, which is a key goal although technology is of paramount importance in Connectivism.

Second hint: Hiring a communications professional right away could quickly spend their budget without exploring more cost-effective ways of marketing and networking, networking also being very important in Connectivism.

Third hint: Using online tools like LinkedIn or GitHub would be more appropriate in the entrepreneurship context and is basically a cost-effective method that would enable them to build connections with people who can contribute to their project without upfront costs.

[End_of_Page]

4.2 Planning and mobilization of teams

Act_ID#4.2.1 Presentation Unit 3.2 [Hypertext, Image, Canva presentation]

[Image]

Figure 78: Stepwise visual representation of the four key learning objectives for developing entrepreneurial skills in schools used in Unit 4.2.1[58]

[Hypertext]

The framework for entrepreneurship in Europe has classified the mobilization of others and therefore teambuilding under the category Resources, and rightfully so since the human capital and the involvement of stakeholders in the entrepreneurial context is one of the most important resources, if not the most essential.

With the recent exception of 'solopreneurs' meaning people who work on projects by themselves, and this mainly applies to the professional context and not school entrepreneurship, the journey of innovation is not taken on a solitary path. It is a collaborative effort during which several people are getting involved: our partners from the beginning (what start uppers call 'co-founders'), our mentors, investors, community members who wish to contribute, professionals who we employ for specific services (e.g., communication or marketing professionals if the team doesn't have a member who can assume this role, and this role is needed).

[58] Source: Created by the graphic designer Lenora on Canva and adapted by author for this course; available at: https://www.canva.com/design/DAGN7JWv3eQ/fCiqDCcYH4y5nLR7emOsfw/edit

Team members and other stakeholders offer different perspectives, and the involvement of others usually implies a faster and more objective conflict resolution. In the presentation below we provide the most important information regarding the difference between team members and other stakeholders and reasons as to why a team needs to be as diverse as possible.

[Canva presentation]

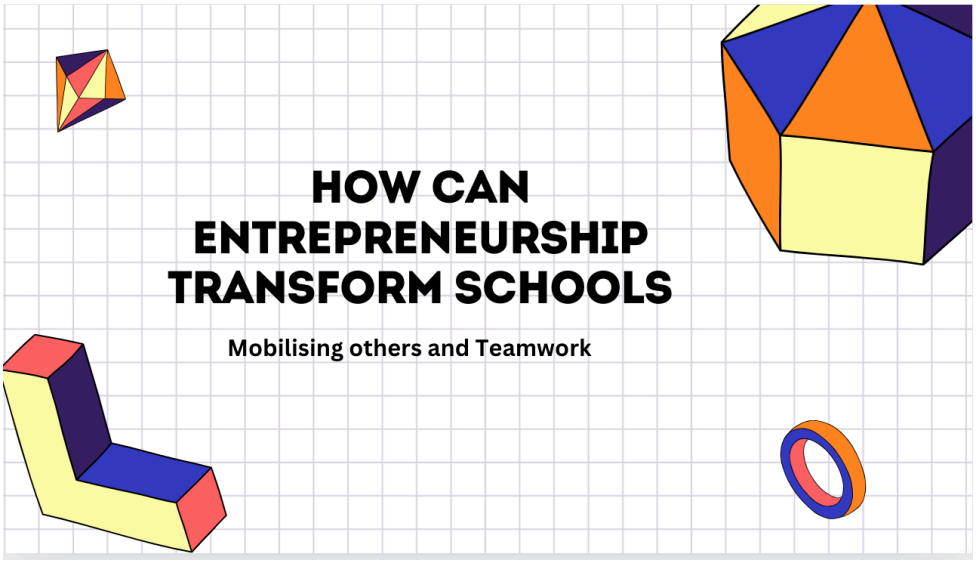


Figure 79: Previewing the presentation used in Unit 4.2.1[59]

[End_of_Page]

Act_ID#4.2.2 [Demonstration] Unit 3.2 [Hypertext, video]

[Hypertext]

In our previous Unit we talked about mobilizing others in joining our efforts for an entrepreneurial endeavor or school project. We saw that those involved aren't necessarily our co-founders or team members, but are in fact external partners, mentors and investors. What would motivate someone spend time, energy, resources and share their knowledge and skills by becoming a partner or even provide their services?

Communication overall and the stage of pitching in particular, is very important for entrepreneurs. It is the opportunity to show one's competency in storytelling, provide clear

[59] Source: Created by the author on Canva and available at: https://www.canva.com/design/DAGN9RYQFWw/S9S9F_XzShqjzmwrXN35lg/edit?utm_content=DAGN9RYQFWw&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

information, be precise and demonstrate how adaptable and ready they are to handle difficult questions. Pitching in itself is something that all schools should consider including in the context of humanities subjects like writing or English; it is a skill that will potentially make or break partnerships, talent recruitment in job fairs, securing funding from mentors and investors. Or simply get someone the career they want for themselves even if entrepreneurial ventures are not in the cards for them.

In the demonstration video below, the team of C'MON – Changemakers'ON, an international social innovation and entrepreneurship program coordinated by European Social Entrepreneurship and Innovative Studies Institute in Lithuania, explain what a good pitch is and which skills are needed for it.

[Video]

Figure 80: Preview of the video on delivering a pitch used in Unit 4.2.2[60]

[End_of_Page]

Act_ID#4.2.3 Practice Unit 3.2 [Hypertext, Quizlet, Miro]

[Hypertext]

In this practice Unit, we would like you to complete a Match the Correct Sentence and Answer quiz based on De Bono's Six Thinking Hats theory, on the topic of pitching for

[60] The Perfect Pitch in 4 Minutes – How to create one for your future investors? [3:55]
Source on YouTube: https://www.youtube.com/watch?v=QYPWGBxpejM
This video is free to reuse under Creative Commons Attribution license (reuse allowed).

audience. Match the statement with the description of the respective hat before organizing a pitch for your audience!

[Quizlet – Flashcards Quiz mode]

1. We need to consider the potential risks and challenges of our idea. Black Hat: Focuses on potential risks, problems, or concerns.
2. Let's focus on how exciting and innovative this idea is for our audience. Yellow Hat: Highlights optimism, benefits, and positive aspects.
3. What are the data and facts that support our pitch's success? White Hat: Emphasizes facts, data, and objective information.
4. How can we think creatively to present our pitch in a unique way? Green Hat: Represents creativity and new ideas.
5. We should remain objective and neutral when analyzing this pitch. Red Hat: Represents emotions and feelings.
6. What is our plan of action to move forward after this pitch? Blue Hat: Focuses on organization, process, and next steps.

Figure 81: Assessment on Quizlet for Unit 4.2.3[61]

[61] Source: Screenshot by the author directly from studio.edunext.co. Match and Answer game created by the author on Quizlet and available here:: https://quizlet.com/gr/938747431/what-makes-a-good-and-engaging-pitch-ft-de-bonos-six-thinking-hats-flash-cards/?funnelUUID=2a51020e-f4ca-4834-b8c3-38044e6b6951

[Hypertext]

Bonus Task – Create your template at your own pace!

After the quiz, take some time to reflect on how your students respond to your questions, what is their argumentative skills level, to what extend they can articulate themselves while presenting an idea. Entrepreneurship relies a lot on communication skills, even if team members possess only technical or financial skills, there needs to be someone who will represent them and present. Take some time to work on a pitch preparation template for your portfolio. Imagine that your students will need to represent their team and pitch their idea to external people and stakeholders: who is going to present, and based on what criteria? What needs to be included in the pitch and what information needs to be included? Will it be textual or visual information?

The template will help you organize your thoughts but will also make you consider how you can boost your students' presentation and communication skills. There are many tools to consider but we have selected for you a template by Miro which utilizes De Bono's Six Thinking Hats theory which you can use with your students for your purpose and assign roles for the preparation! For example, the most analytical student can consider delivering the pitch (being the blue hat) while others work on various aspects. Once you are done, you can go to the forum area, start a thread and share your template and ideas with your peers.

[Miro]

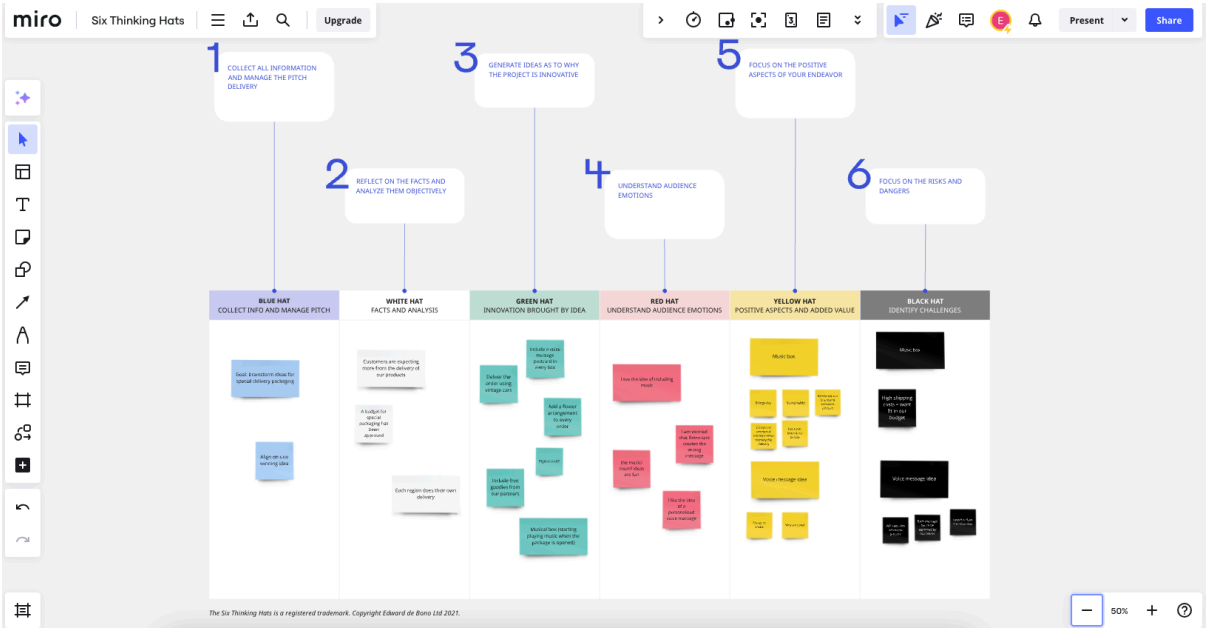


Figure 82: ***Example of a pitch preparation template for teachers and schools based on De Bono's Six Thinking Hats used in Unit 4.2.3***[62]

[End_of_Page]

Act_ID#4.2.4 Self-evaluation Unit 3.2 [Hypertext, Drop Down Problem with Hints and Feedback]

[Hypertext]

In the following scenarios your knowledge and attitudes about team building and mobilizing others for your project will be evaluated. Take the opportunity to evaluate where you currently stand by choosing a response you consider correct; you may try again as many times as you wish and once you find the correct answer the explanation will be available to you. Your responses will not impact your final grade in any way.

[Drop Down Problem with Hints and Feedback]

Scenario 1: Marina's school has formed a team of students eager to participate in entrepreneurial projects. They want to work on an idea of creating a water filter to make water in their area consumable. To materialize the project they need support from local businesses and they are given the opportunity to pitch their project idea.

[62] The template was originally created by the author on Miro and is available at: https://miro.com/welcomeonboard/Yjh2SklzY3dlWXFFeER0R0ZsMVR5U2dhRFdVamFiR0RzaVBFb1hzWk5kZkUxNUxndm1meEtLdVVHY3EwU3BBS3wzNDU4NzY0NTk3MjI5ODg5Mjc1fDI=?share_link_id=548038094510

Question: Which pitch strategy is most likely to engage local businesses and secure their support for Marina's team's water filter project while also reflecting the Problem-Based Learning teaching method?

A) Apply a Problem-Based Learning approach by emphasizing the local water issue, explaining how the filter solves the problem, and inviting businesses to collaborate on a community-driven solution.

B) Focus the pitch entirely on the technical specifications of the water filter and how it works.

C) Highlight only the potential profits for local businesses without discussing the community benefits of the project.

D) Use the pitch to talk about the team's enthusiasm and hard work without explaining how the project aligns with local needs.

Hints

First hint: PBL involves problem identification, solution development, and collaboration, which makes it ideal for drawing local businesses into the project as partners in addressing a shared community issue.

Second hint: Highlighting only profit potential might alienate businesses that value community impact and corporate social responsibility.

Third hint: Discussing enthusiastically doesn't demonstrate a clear connection to the local problem or how the businesses can contribute.

Scenario 2: The same group has developed an ambitious plan to implement a composting project that foresees using waste from the school's canteen into compost for the school park. Due to the use of waste they need approval from the school's administration, teachers, the canteen's manager and the parents as well. They have to present their idea in front of these stakeholders and justify the rationale, the extra work they need to put into and discuss any potential hazards.

Question: How can the team effectively approach their presentation and provide a strong argument for each distinct stakeholder (administration, teachers, the canteen's manager, and parents) to secure approval for the composting project while complying with Problem-Based Learning theory principles. How can they do it?

A) Focus on the benefits for the school park without addressing the concerns of different stakeholders.

B) Apply a Problem-Based Learning approach by presenting how the composting project solves waste management issues in the canteen, improves the school's environmental footprint, and integrates educational opportunities for students.

C) Emphasize the extra work required by the project, suggesting that all stakeholders must be willing to take on additional responsibilities.

D) Provide only general statements about the benefits of composting without tailoring arguments to each stakeholder's concerns.

Hints

First hint: The team needs to present tailored arguments that address the specific concerns of each stakeholder group in an attempt to solve the problem.

Second hint: Putting a lot of focus on the extra work for those involved, may discourage support instead of emphasizing the benefits.

Third hint: Being vague or lack of compelling reasons for each group to get involved will not highlight the actual problem for any stakeholder.

[End_of_Page]

4.3 Recap and self-assessment Micro-MOOC 3

Act_ID#4.3.1Micro-MOOC 3 recap[Hypertext]

[Hypertext]

In the third Micro-MOOC we learned about:

- Key Competence Area 2 about Resources in the EntreComp framework.
- What consists material and non-material resources.

- Pitching as a communication strategy to involve stakeholders in the team building process.

We also saw:

- Examples of tools, templates and activities to map and organize your resources and pitch preparation.
- Through the scenarios we examined strategies to organize the mobilization phase before the launch of a project (competencies 2.3 Mobilizing resources and 2.5 Mobilizing others).

[End_of_Page]

Act_ID#4.3.2 Open Response Assessment Assignment: Report

[Open Response Assessment]

The rationale

Your school is experimenting with various forms of entrepreneurship and you alongside your students have decided to explore sports entrepreneurship. You have earned generous funding to design a project which you will be implementing gradually. You need to justify what you did with the funding, how it benefited your students, how it contributed to the school's development and which aspect of sports did your students discover.

The task

You need to write a brief report discussing your experience, summarizing past actions, current developments and how you see this endeavor develop in the future.

Useful tips

- You need to write a report of at least 400 words, it should be as descriptive as possible, but it isn't the final report therefore keep it to the point and brief.
- You need to specifically refer to the capacity building aspect of this project for the school's community.
- You need to refer to your students' reception of this project.

Brief description of the criteria

- I understood the assignment and the scope of this project and it is reflected in my report.
- I have an elaborate description of the opportunities and challenges this project had for my students using examples.
- I gave an elaborate description using examples about the activities we implemented.
- I described to what extent I was able to monitor and support my students and how the received this project.

Table 13: Rubric used in the Open Response Assessment in micro-MOOC 3

Criteria	Needs Improvement (1 point)	Satisfactory (2 points)	Proficient (3 points)	Exemplary (4 points)
Clarity and organization	My report is poorly organized, with unclear ideas and significant issues in grammar or clarity.	My report has a basic structure, but some ideas may be disjointed or unclear. There are a few grammar issues.	My report is organized, with a clear structure and logical flow. My writing is generally clear, with some minor issues.	My report is well-organized, with clear and logical structure. My writing is precise, with strong transitions between ideas.
Description of challenges and opportunities	Sports entrepreneurship was not our planned activity as we wanted to work on something related to social entrepreneurship. For this reason, we didn't manage to navigate any opportunities or challenges as we didn't know where to start from, and this is reflected in my report.	With a lot of work while having no other support we were able to define two challenges and two opportunities that may arise from sports entrepreneurship and we briefly presented them in the report in bullet points.	My students and I enjoyed the topic a lot; before the report we did extensive research and took notice of common challenges and opportunities through other case studies. My report presents our effort in great detail.	My students and I were surprised to see how much is going on in the sports entrepreneurship universe. We worked on topics such as sports technology, events, merchandise, fitness, media successfully and navigated complex issues about the creation of content and business planning.

Criteria	Needs Improvement (1 point)	Satisfactory (2 points)	Proficient (3 points)	Exemplary (4 points)
Description of activities that took place	I was unable to plan any original activities for this project.	We were able to plan one activity as research took the majority of our time. Together with my students we talked to a [e.g., sports manager].	We did a thorough plan of activities which we will share eventually and we allocated the majority of our budget towards this goal. We include information about the people involved and places we visited.	My students worked on different activities and drafted brief case studies for [e.g., a fitness application, smart devices that measure performance and nutrition products for athletes]. We were able to allocate a small fraction of the budget there and we kept most of it for upcoming activities.
Students support, reception and attitude	I was unable to monitor my students reception and attitude and support them because the organization was too demanding.	I gave minimal support to my students because this was a new endeavor for school staff as well. They remained curious but not very engaged.	I was able to support my students and this is reflected in my report too. We structured every activity together and worked collaborative on every task.	I did my best to support my students and I was successful. They responded with incredible professionalism, divided the tasks between them and each one took full responsibility of their role and tasks.

Criteria prompts:

- What elements make a report well-structured and coherent?
- How you describe the challenges you faced matters, not everything is about the evaluation; be constructive.
- The description of your activities provides a good opportunity to reflect on the steps you took.
- Students' feedback and response is always crucial in education; make the most of it while providing details.

[End_of_Page]

Act_ID#4.3.3 Self-evaluation Checklist: I can… [Hypertext, Poll, Word cloud – Quizizz, W3Schools, Get Bootstrap, Imgbb]

[Hypertext]

The purpose of this checklist is for you to determine whether you feel confident dealing with issues discussed in this unit. You might find it useful in detecting whether you need additional study or support; in the next Unit you will have the opportunity to discuss these topics with your peers at the forum area and in the final Unit we will provide an indicative list of resources for you to consider.

[Poll]

1. I can refer to Key Area of Competencies 2 Resources of EntreComp and explain the difference between material and non-material resources.

- No, I cannot.
- Potentially with some assistance.
- I can confidently do that.

2. I can explain why communication is a transversal skill and how some aspects of it like pitching new ideas are important despite not officially part of the curriculum.

- No, I cannot.
- Potentially with some assistance.
- I can confidently do that.

3. I can design interesting projects about various types of entrepreneurship using some digital tools and templates and design my own template if the existing ones don't cover me.

- No, I cannot.
- Potentially with some assistance.
- I can confidently do that.

[Word Cloud – Quizizz]

What was the most useful thing you learned in this Micro-MOOC? Let us know in the word cloud and come back to see what other course participants mentioned!

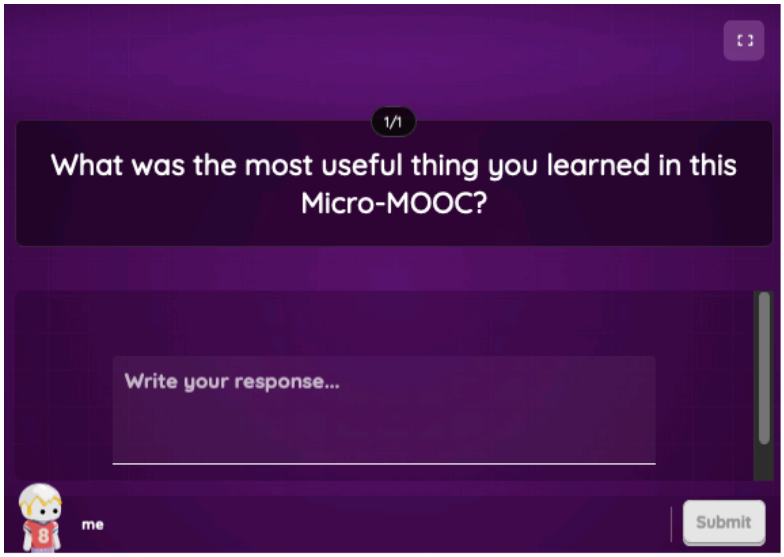


Figure 83: : Preview of Quizizz used for feedback purposes in Unit 4.3.3[63]

[W3Schools]

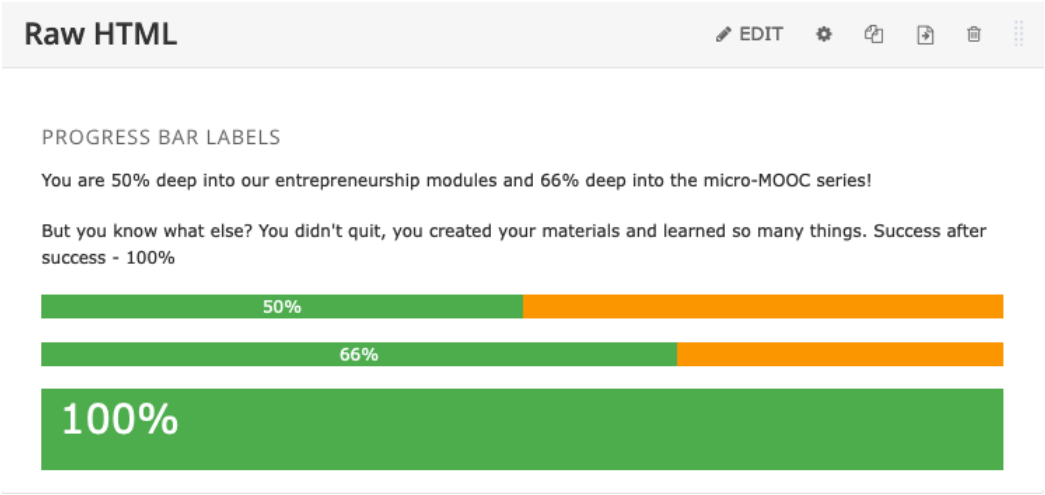


Figure 84: Image depicting the open-source tool W3Schools and the progress bar in Unit 4.3.3[64]

[Get Bootstrap]

[63] Source: Screenshot by the author, the assessment was created by the author on Quizizz and is available at: https://quizizz.com/admin/quiz/66d1cdc336ebba05af597ab9?searchLocale=

[64] Progress bar with positive reinforcement message to help participants track their progress in the course. Created by the author directly on Edunext with customized HTML code found on the open-source website W3Schools. The respective category is available here: https://www.w3schools.com/w3css/w3css_progressbar.asp

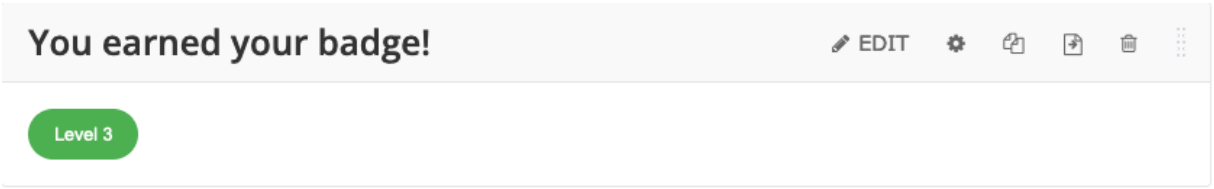


Figure 85: Image depicting the Level badge for Unit 4.3.3[65]

[Canva and Imgbb]

Figure 86: Image depicting the accomplishment badge created on Canva and generated on Imgbb for Unit 4.3.3[66]

[End_of_Page]

Act_ID#4.3.4 [Discussion Forum]

We hope that by the end of this Micro-MOOC you will have learned more about the resources you need to talk about while introducing your students to entrepreneurship. You are now requested to join your peers in the forum area and discuss about the two following topics.

1) Who would you invite at your school to talk about entrepreneurship to the school's administration? Your students will ultimately learn from you, but who do you think that would contribute towards your development?

[65] Created by the author directly on Edunext with customized HTML code found on the open-source website Get Bootstrap. The respective category is available here: https://getbootstrap.com/docs/4.0/components/badge/

[66] Designed by the author on Canva and embedded on Edunext with an HTML code generated on https://imgbb.com/
Available at: https://www.canva.com/design/DAGRmeEgjqk/F-yWlGH-BhgTrMx6gWpehA/edit?utm_content=DAGRmeEgjqk&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

2) Which pedagogical method would you employ to design a STEAM project with your students? Would it be Project-Based Learning or another one, and what kind of project would that be, involving which colleagues?

[End_of_Page]

4.4 Additional resources and material

Act_ID#4.4.1[Recommendations for further learning]

- European Commission: Joint Research Centre (2016). Bacigalupo, M., Kampylis, P., Punie, Y. and Brande, G., *EntreComp – The entrepreneurship competence framework*, Publications Office, https://data.europa.eu/doi/10.2791/160811
- Engeström, R., & Käyhkö, L. (2021). A critical search for the learning object across school and out-of-school contexts: A case of entrepreneurship education. *Journal of the Learning Sciences*, *30*(3), 401–432. https://doi.org/10.1080/10508406.2021.1908296
- Eurydice (European Education and Culture Executive Agency), Bourgeois, A., Balcon, M.-P., Riiheläinen, J. M., Antoine, A., Noorani, S., & Zagordo, M. (2016). *Entrepreneurship education at school in Europe: Eurydice report*. Publications Office of the European Union. https://data.europa.eu/doi/10.2797/301610
- European Education and Culture Executive Agency, Eurydice, Bourgeois, A., Balcon, M., Riiheläinen, J. et al., *Entrepreneurship education at school in Europe – Eurydice report*, Publications Office of the European Union, 2016, https://data.europa.eu/doi/10.2797/301610

[End_of_Page]
[End_of_Topic]

Day 5: Micro-MOOC 4 – Enhancing school entrepreneurship through planning and teamwork (3 hours)

5.0 Introduction

Act_ID#5.0.1 [Presentation] Learning outcomes [Hypertext, Google Forms – Poll]

[Hypertext]

Following the successful attendance of this Micro-MOOC, you will be familiar with Key Areas 1 and 3 of EntreComp, and more specifically the competencies 3.2 Planning and management, and 1.1 Spotting opportunities. These goals correspond to the Intermediate level of competence, and the stage of Experiment Level 3, which is the respective B1 level in other competence frameworks. More specifically:

- You will be able to understand what an action plan is and why is it considered important for the introduction of your students to entrepreneurial thinking and activities.
- You will be able to understand how spotting opportunities in your surroundings can be linked to real-world problems and how you can try to solve them.

We would like you to respond to a few questions below self-evaluating your previous experience, knowledge or attitudes. You may come back to the poll if you wish to see what other participants have responded and potentially initiate a discussion in the forum area. These responses will not affect your final grade.

[Google Forms - Poll]

Poll 1: To your knowledge, do you think that short term and long-term goals in education can be approached the same way as in entrepreneurship? By setting goals, a timeline and an action plan?

- Yes, I think they can.
- I have never thought about this, but I think they can be approached the same way.
- I don't see any link between entrepreneurship and education.
- No, they cannot be linked in any way.

Poll 2: Education goals can be stressful for your students as they are linked with exams. Is there any way to make your students goal-oriented without thinking about evaluation?

- No, having exams and therefore constantly thinking about and preparing for them keeps my students alert.
- While I try to help my students avoid unnecessary stress, the end result can only be measured through evaluation.
- You can assist your students as much as possible to prepare but eventually they need to be evaluated.
- Yes, it is important for the students to acquire the necessary skills and go after their goals in education and in general and for that you need to instill resilience in them.

Poll 3: How often do you discuss with your students topics that relate to the real world and actual societal problems?

- Never, I don't know how to approach real world problems in the subject I teach.
- We don't deviate from the official curriculum, but we try to discuss real-world problems in class.
- We occasionally assign homework about real world challenges and/or assign homework.
- We are accustomed to not only discuss about real world challenges but also implement projects in the context of all subjects.

[End_of_Page]

5.1 Action plan design for the management of short-term and long-term goals

Act_ID# 5.1.1 Presentation Unit 4.1 [Image, Hypertext, Canva presentation]

[Image]

Figure 87: Stepwise visual representation of the four key learning objectives for developing entrepreneurial skills in schools used in Unit 5.1.1[67]

[67] Source: Created by the graphic designer Lenora on Canva and adapted by author for this course; available at: https://www.canva.com/design/DAGN7JWv3eQ/fCiqDCcYH4y5nLR7emOsfw/edit

[Hypertext]

Why did EntreComp include planning and management among the key areas of competencies for entrepreneurship, and why are short-term and long-term goals and the design of an action plan mentioned as key skills to develop?

Setting goals is nothing new in education with relevant frameworks like SMART, standing for specific, measurable, achievable, relevant and time-bound being adopted as early on as the 80s. The specific framework was however, developed for project management purposes and through the content of this Unit we aim at giving a new perspective to goal setting which is traditionally linked with exams in education and not in the acquisition of life skills and competencies. Goals can be the incentive to manage one's time better, to have a sense of direction and to instill discipline, and all of them are qualities that as a teacher you want your students to have and come down to one thing: action planning and management.

[Canva presentation]

Figure 88: Previewing the presentation used in Unit 5.1.1[68]

[End_of_Page]

[68] Source: Created by the author on Canva and available at: https://www.canva.com/design/DAGOD5Q7Lek/S6LrJT1SXwDBjOQQgJDSxg/edit?utm_content=DAGOD5Q7Lek&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

Act_ID# 5.1.2 Demonstration Unit 5.1 [Hypertext, video]

[Hypertext]

In education and in entrepreneurship, but also in our everyday lives, we are called daily to make decisions, act and plan. The incentives might concern our academic performance, building a product or a company, dealing with a family problem; the process is the same: we need to understand what our problem is, define our goals and take steps, an action plan, before we proceed.

In the demonstration video that follows, you will learn more about the SMART goals framework with examples and tips on how to set goals, keep record of these goals and how an objective is met.

[Video]

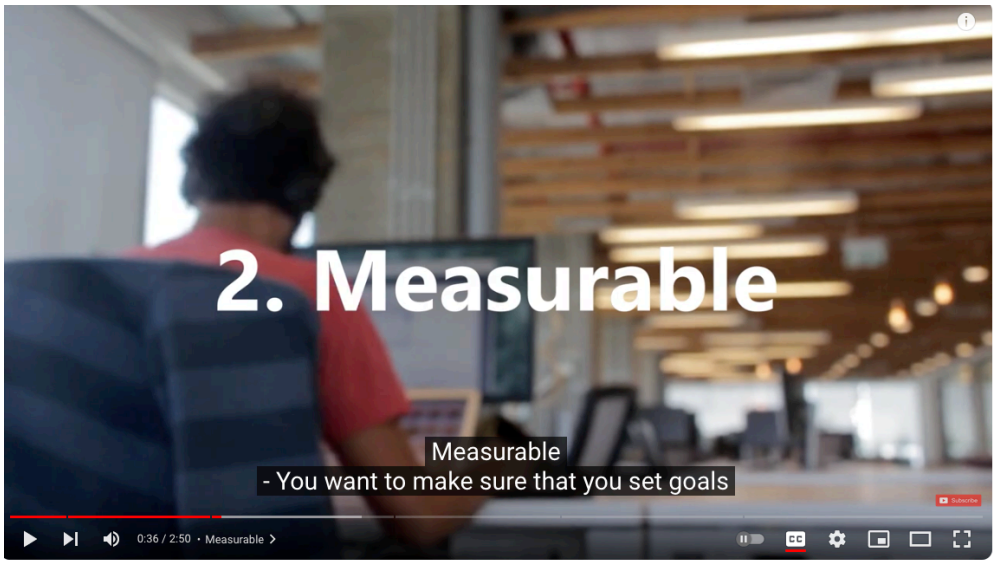


Figure 89: Preview of the video on setting smart goals used in Unit 5.1.2[69]

[End_of_Page]

[69] Smart Goals – How to properly set a goal [2:50]
Source on YouTube: https://www.youtube.com/watch?v=K5W3tRMpPwc
This video is free to reuse under Creative Commons Attribution license (reuse allowed).

Act_ID# 5.1.3 Practice Unit 4.1 [Hypertext and Multiple-choice test on Quizlet]

[Hypertext]

In this practice Unit, we would like you to try out the below multiple-choice quiz taken in test study mode. It will help you evaluate your understanding of the SMART goals framework in the context of entrepreneurship projects at school. These quizzes are meant to help you understand the content of the Micro-MOOC and carry no weight towards your final grade!

[Quizlet – Multiple choice- Test study mode]

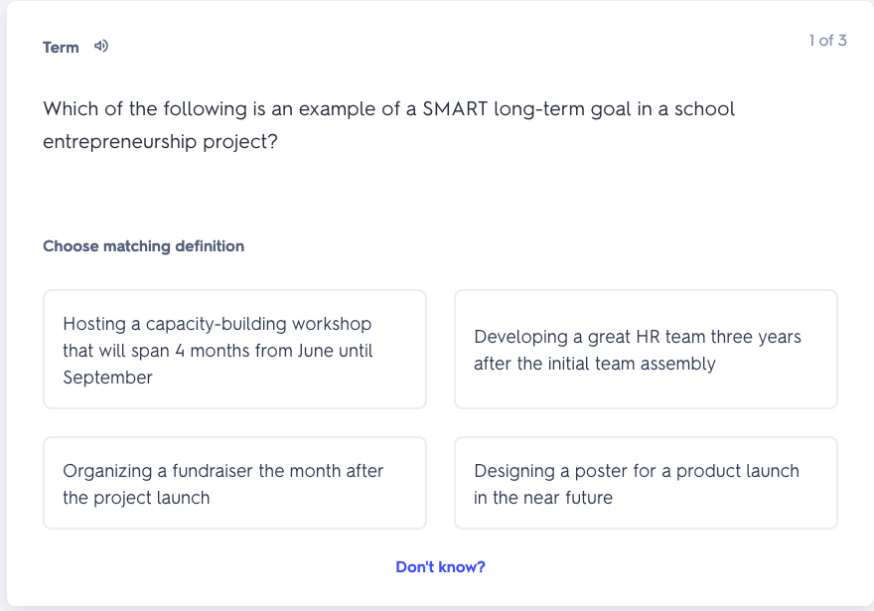


Figure 90: Assessment on Quizlet for Unit 5.1.3[70]

[Hypertext, image]

Bonus Task – Create your template at your own pace!

We hope that you are feeling a bit more confident discussing about short-term and long-term goals, and action plans. Even more so, we hope that you made a link as to why this is a process that applies to project management and entrepreneurship as much as in education, besides we saw earlier in our presentation that SMART Goals as a framework was originally developed for managers before being adopted at large by teachers.

[70] Source: Screenshot by the author directly from studio.edunext.co. Multiple choice quiz created by the author on Quizlet and available here: https://quizlet.com/938769958/test?funnelUUID=df974557-6708-4641-a089-3d1e0e4590b8

We would like to encourage you to experiment with the Canva tool and create your first action plan for a mini project that you will implement with your students. Even if you don't have the time to fully implement it, starting out is very important as it will fuel your ideas for the next academic year. Canva is an easily accessible tool that allows you to change formats and add pages while maintaining all the characteristics. Once you are done, you are welcome to join your peers at the forum area and discuss the following topics:

1) How much time should a team of students and their teacher dedicate in their first entrepreneurship project if they have no prior experience?

2) Should you try to include as many goals, objectives and aspects to deal with in that project or are you going to intimidate your students? Is it necessary for example to make them research about the financial goals of a project?

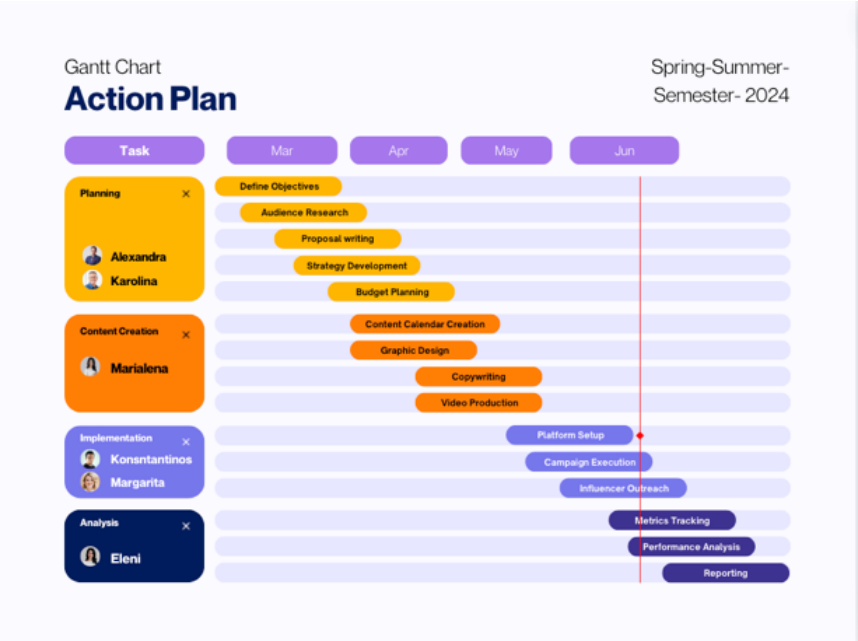


Figure 91: Example of an action plan template for learners used in Unit 5.1.3[71]

[End_of_Page]

[71] The template was originally created by the graphic designer Antler on Canva and adapted by the creator of this course. Available at: https://www.canva.com/design/DAGOJDtKlz8/IDCPfEc5jFHUtkT7qU2EHg/edit?utm_content=DAGOJDtKlz8&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

Act_ID# 5.1.4 Self-evaluation Unit 4.1 [Hypertext, Drop Down Problem with Hints and Feedback]

[Hypertext]

In the following scenarios your attitude towards goal setting will be examined. Take the opportunity to evaluate where you currently stand by choosing a response you consider correct; you may try again as many times as you wish and once you find the correct answer the explanation will be available to you. Your responses will not impact your final grade in any way.

[**Dropdown problem with Hints and Feedback**]

Scenario 1: Maria is leading a promising team of students at her high school through a Project-Based Learning (PBL) initiative. The students are tasked with a real-world project: installing interactive whiteboards in classrooms. In line with PBL, they must also organize a workshop for teachers, educating them on the significance of these tools and demonstrating activities that can be implemented using the whiteboards. This student-led project involves research, collaboration, problem-solving, and hands-on execution. To ensure success, Maria must guide the students in drafting a detailed action plan with both short-term and long-term goals, following the PBL approach that emphasizes learning through real-world projects.

Question: Which combination of short-term and long-term goals would be most effective for the planning of this workshop?

A) Short-term: Purchase whiteboards and long-term: Install whiteboards in classrooms.
B) Short-term: Research interactive whiteboards and develop workshop content; Long-term: Conduct teacher training and provide ongoing support.
C) Short-term: Create a workshop flyer and long-term: Order snacks for the workshop.
D) Short-term: Develop a lesson plan for using whiteboards and long-term: Teach students how to use whiteboards.

Hints

First hint: Choose short-term and long-term goals in moderation and sensibly setting realistic, viable and impactful goals for the given timeframes.

Second hint: Only focusing on logistics results in missing the crucial elements of educating teachers and supporting them in the long run.
Third hint: Narrowing the project to focus solely on developing lesson plans and teaching students, will result in missing the workshop's objective and broader teacher engagement.

Scenario 2: Christina is leading an entrepreneurship team at her school alongside her classmates. As part of a Project-Based Learning (PBL) initiative, the team has been experimenting with various entrepreneurial ventures, successfully implementing several action plans in the past. Now, they are taking on a larger challenge: partnering with another school for a bigger project. The project requires careful planning, collaboration, and problem-solving to ensure the partnership is secure and the team stays on top of the situation. Christina must guide her team through a detailed action plan, setting both short-term and long-term goals to ensure the project is managed effectively, in line with PBL's focus on real-world problem-solving and hands-on learning.

Question: Which of the following action plans would be most effective?

A) Short-term: Contact the other school and arrange an introductory meeting; Long-term: Maintain open communication and collaborate on project goals.
B) Short-term: Finalize the project idea and long-term: Purchase materials for the project.
C) Short-term: Prepare a presentation about past initiatives and long-term: Write a report on the project.
D) Short-term: Set up a social media page for the project and long-term: Post updates online.

Hints
First hint: Setting up a social media page and posting updates are promotional tasks that do not reflect the essential planning and communication required for securing and maintaining the partnership.
Second hint: Preparing a presentation and writing a report are passive steps that do not address the immediate need for building the partnership and collaborating.
Third hint: Proactively closing all urgent tasks and involving all stakeholders as soon as possible is the best way that also aligns with PBL framework.

[End_of_Page]

5.2 Identifying opportunities and creating value for the society and economy

Act_ID# 5.2.1 Presentation Unit 4.2 [Hypertext, Image, Canva presentation]

[Image]

Figure 92: Stepwise visual representation of the four key learning objectives for developing entrepreneurial skills in schools used in Unit 5.2.1[72]

[Hypertext]

In education, we tend to advise students before choosing their professional path that a certain career is a great opportunity, and if they ask why the commonly used response is that there are financial gains. Instilling entrepreneurial thinking and mindset to your students is worthy long-term because they will learn how to create value for life. Opportunity spotting can be applied in every domain possible and is often aligned with a specific type of entrepreneurship: you may observe that children if your community are underprivileged, so you can develop a free and easily accessible EdTech product to assign them.

[72] Source: Created by the graphic designer Lenora on Canva and adapted by author for this course; available at: https://www.canva.com/design/DAGN7JWv3eQ/fCiqDCcYH4y5nLR7emOsfw/edit

There are several megacities around the world where the majority of people live below poverty line, so you might attempt to invest and create jobs contributing this way to infrastructure development, urban revitalization and innovation. You may notice that obesity is a real problem in your community affecting people's lives, you can act and become a sports entrepreneur by starting a sports training and coaching service. The examples and possibilities are endless. All it takes it to think outside the box. Regrettably it is very difficult to include this type of activities and research in the official curriculum because the capacity building programs for teachers on this topic are limited, and this is what we are trying to address with this course.

Below we have prepared a presentation for you with some tips and advice on how to approach the topic of spotting opportunities and initiating action with your students.

[Canva presentation]

Figure 93: Previewing the presentation used in Unit 5.2.1[73]

[73] Source: The template was created by the graphic designer tmintco and adapted by the creator of the course on Canva. Available at: https://www.canva.com/design/DAGOM8shroQ/uhZ5AxcRnE5zvR9DMg1vxQ/edit?utm_content=DAGOM8shroQ&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

[Hypertext]

Fact of the day!

Did you know that according to Eurydice, an education network coordinated by the European Commission, despite mentioning that 17 countries across Europe include entrepreneurship in the curriculum, there are no actual metrics to measure the impact? This is reflected in the two graphs below. In the first graph, the lack of a common approach even within the EU is observed with every country –and in cases like Belgium every region – adopts a different education policy. In the second graph, we see that even countries that have included entrepreneurship in the curriculum, don't have a common approach as to where they should classify the implementation of this course (STEM, humanities, economics, arts, etc.). This is an area in education that needs special attention and one of the reasons EntreComp is so relevant, especially if we consider that business schools and Universities around the world are actively teaching this subject in the context of business or engineering studies potentially discouraging students from applying; entrepreneurship is a transversal skill.

[Image]

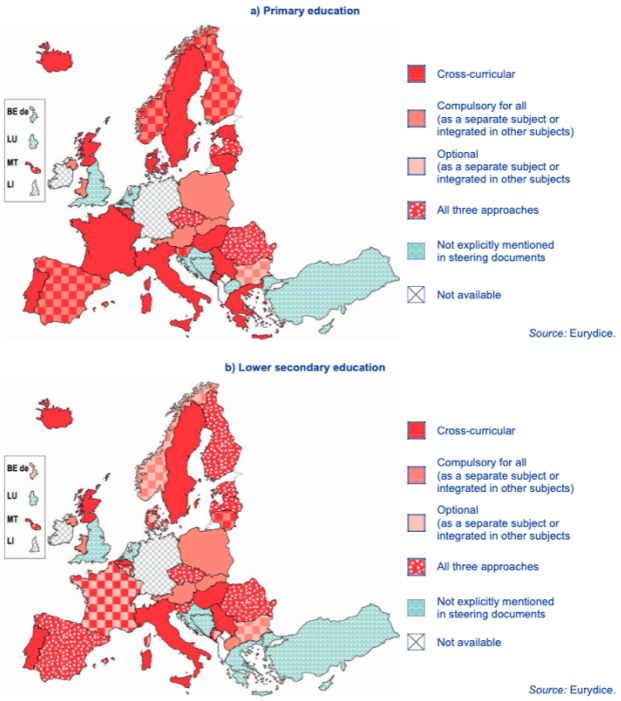


Figure 94: The state of entrepreneurship education in Primary and Secondary schools in Europe[74]

[74] Source: Eurydice Report - Entrepreneurship Education at School in Europe

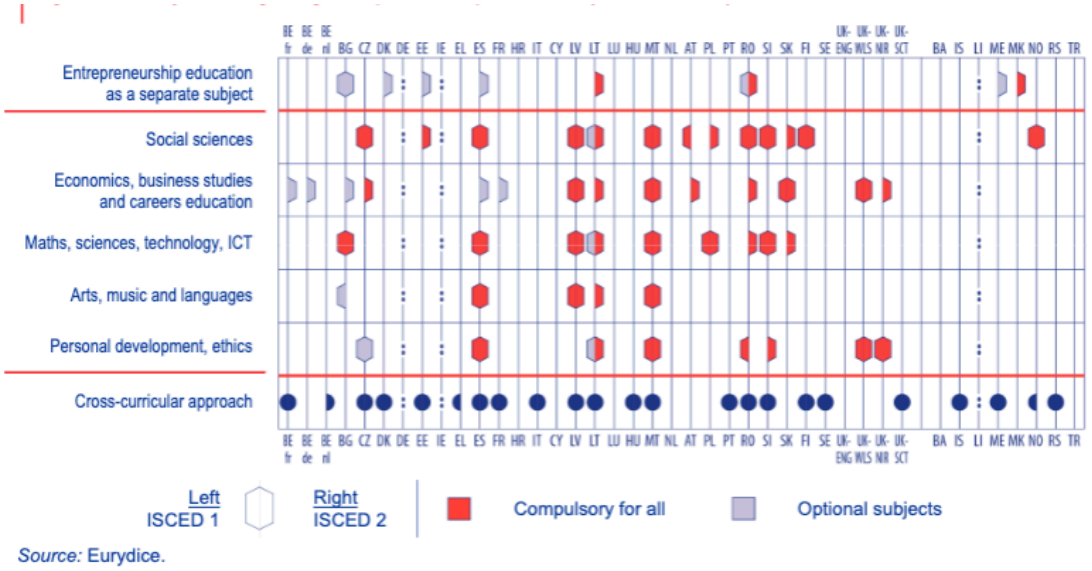


Figure 95: Subjects where entrepreneurship is taught in the context of mandatory or optional courses[75]

[End_of_Page]

Act_ID# 5.2.2DemonstrationUnit 4.2 [Hypertext, video]

[Hypertext]

Today's world faces significant social and environmental challenges like climate change, resource shortages, and inequality. While these problems are daunting, they also create unique opportunities for innovation and positive impact. Entrepreneurs and individuals can harness these issues to develop sustainable products, green technologies, or social enterprises that make a difference.

To seize these opportunities, it's crucial to know how to identify them and analyze the relevant information effectively. For this lesson, we'll use resources like the open-source site *Our World in Data* and Google Maps to explore how data can inform and inspire entrepreneurial ventures aimed at addressing these global challenges.

As educators, your role is to guide students in thinking critically about these issues. For instance, when discussing poverty, consider engaging your students in understanding its complexities and encouraging them to think about innovative solutions. This approach not only highlights the need for action but also shows that everyone has the potential to contribute to improving the lives of others.

[75] Source: Eurydice Report - Entrepreneurship Education at School in Europe

[Video]

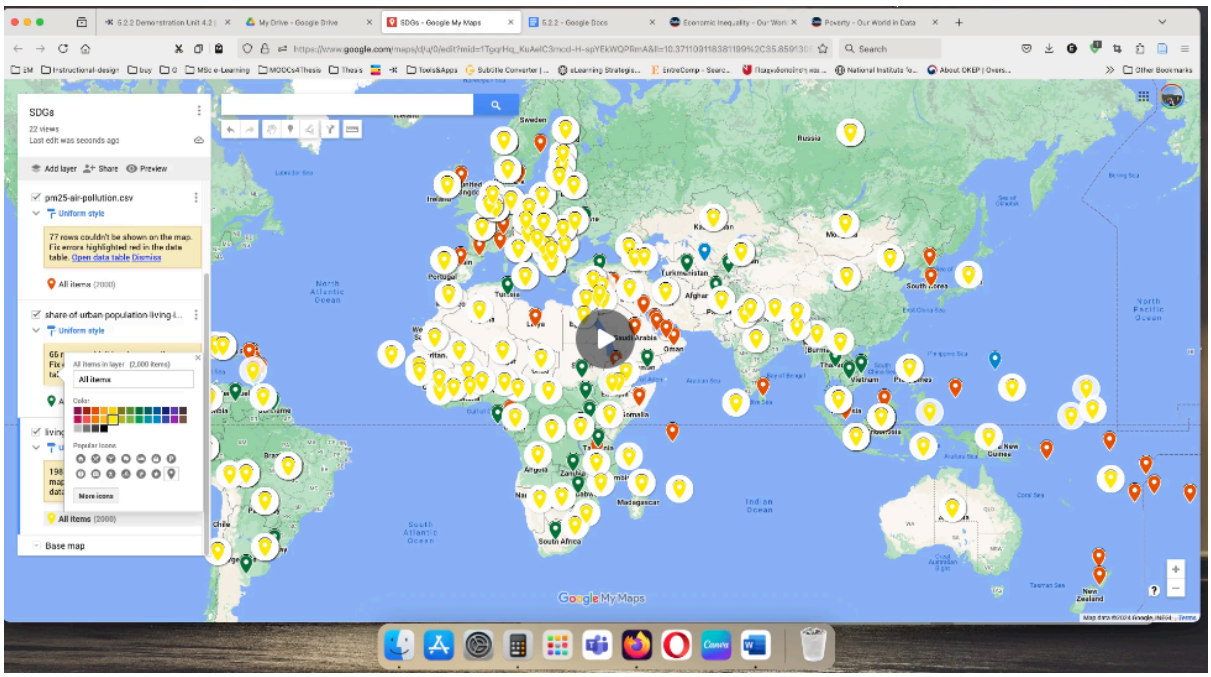


Figure 96: Preview of the video on the use of data to explore real-world problems used in Unit 5.2.2[76]

[End_of_Page]

Act_ID# 5.2.3 Practice Unit 4.2 [Hypertext, Quizlet, Canva]

[Hypertext]

In this practice Unit, we would like you to try out the below Match and Answer game choosing the pairs and evaluate if your current knowledge and beliefs are aligned with what we have seen previously on the topic of spotting or creating opportunities. These quizzes are meant to help you understand the content of the Micro-MOOC and carry no weight towards your final grade!

[Quizlet]

1. Opportunity: Market Gap

   Match with: A product or service that is missing or underserved in a specific market.

[76] The video Entrepreneurship is seeing opportunities behind every problem [2:37] was Created by the author and is available at: https://youtu.be/Hb8TC-dDaAk under license Attribution Non-Commercial No Derivatives

2. Opportunity: Emerging Trends

   Match with: Changes in technology, culture, or economy that can lead to new business ideas.

3. Opportunity: Problem-Solving

   Match with: Identifying a problem people face and creating a solution through a product or service.

4. Method: Industry Research

   Match with: Keeping up with industry reports and news to discover potential trends or gaps in the market.

Figure 97: Assessment on Quizlet for Unit 5.2.3[77]

Bonus Task – Create your template at your own pace!

You are used to creating your lesson plans for your students, however now we want you to create a mini pack of resources. Think what resources would be best for your students and start building your own portfolio for entrepreneurship related activities. It can be

[77] Source: Screenshot by the author directly from studio.edunext.co. Match and Answer game created by the author on Quizlet and available here: https://quizlet.com/939123252/match?funnelUUID=e6f355e2-4eec-458e-85c5-93aa81123d2a

videos, materials, open-source projects, scheduled visits to companies, or anything that might trigger their incentive to work with you on these topics. When you are done, you can go to the forum area, create a thread to share your template with your peers and exchange opinions. We have prepared an example of a template on Canva; you can use this one or create your own!

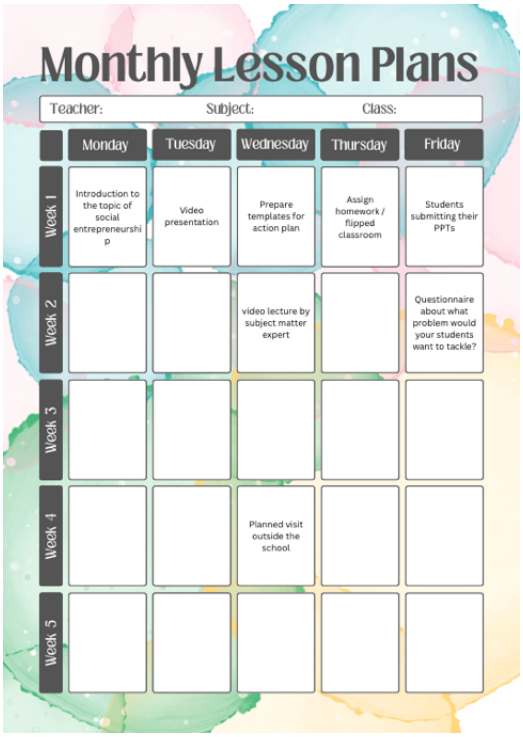


Figure 98: Example of a lesson plan template where teachers can plan materials and activities used in Unit 5.2.3[78]

[End_of_Page]

Act_ID# 5.2.4 Self-evaluation Unit 4.2 [Hypertext and Dropdown problem with Hints and Feedback]

[Hypertext]

In the following scenarios your attitude towards opportunity assessment and the skill to create value will be examined. Take the opportunity to evaluate where you currently stand by choosing a response you consider correct; you may try again as many times as you wish and once you find the correct answer the explanation will be available to you. Your responses will not impact your final grade in any way.

[78] Source: Created by the graphic designer Daydream Deigns on Canva and adapted by the author.
It is available at creator's account at
https://www.canva.com/design/DAGOORgtXxA/KR81T75t8Oz0k4nKWZqK4Q/edit?utm_content=DAGOORgtXxA&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

[**Dropdown problem with Hints and Feedback**]

Scenario 1: Artemis is coordinating a group of students who are concerned about the growing traffic congestion and the lack of safe walking routes in their neighborhood. As part of a Project-Based Learning (PBL) initiative, they are working on a student-led entrepreneurship project focused on urban innovation and sustainability. Through brainstorming and collaboration, the students aim to create and disseminate an action plan that addresses these local urban issues. Since urban planning isn't an established type of entrepreneurship with easily accessible resources, the team must rely on creative problem-solving, real-world research, and community engagement to develop their project.

In PBL, the students are encouraged to take ownership of their learning by investigating the problem, consulting experts, collaborating with the community, and developing innovative solutions to these real-world challenges. Their final goal is to implement a tangible plan that not only tackles the traffic congestion and improves walking routes but also promotes sustainable, entrepreneurial thinking.

Question: What would be the best way to navigate this problem considering that urban planning isn't an established type of entrepreneurship per se and therefore there are few ideas and resources online?

A) Focus on researching successful urban planning projects from other cities and adapt them to their neighborhood.

B) Give up on urban planning and shift focus to a different type of entrepreneurship with more resources available online.

C) Collaborate with urban planners, local government, and community members to gain insights and develop a unique approach.

D) Search for online business models and apply them directly to their urban planning problem without much customization.

Hints

First hint: An answer that emphasizes on real-world engagement, community involvement, and creative problem-solving reflects the principles of Project-Based Learning best.

Second hint: Even if a response fits most criteria it still is not the right one if it is missing the hands-on collaborative aspect.

Third hint: Applying generic online business models without customizing them on the exact problem is pointless and creates frustration even when creative approaches like PBL are used.

Scenario 2: Elpiniki's students at the high school where she teaches are concerned about the limited access to basic financial services in their community. Coupled with a lack of financial education, many people struggle to manage their finances effectively. As part of a Project-Based Learning (PBL) initiative, the students aim to develop a social entrepreneurship project that leverages financial technology (FinTech) to address these challenges. They want to create a solution that not only improves access to financial services but also enhances financial literacy in their community.

In line with PBL, the students are actively researching the problem, brainstorming innovative ideas, and engaging with community members. Their project will ultimately result in a practical solution that combines financial education, technology, and social impact. Elpiniki's role is to guide them as they collaborate, think critically, and take ownership of the project from start to finish, ensuring that the solution is both effective and sustainable.

Question: What should Elpiniki advise her students do in order to choose the best solution that combines financial literacy, action, and social entrepreneurship?

A) Research existing financial literacy apps and copy their features without adaptation.

B) Conduct surveys and interviews within the community to understand their specific financial challenges, then design a FinTech solution that addresses these needs while providing educational resources.

C) Focus only on educating the community about financial services, without developing any technological solutions.

D) Choose the most popular FinTech solution available and implement it directly without community input or customization.

Hints

First hint: You can't just focus on education without the action-oriented component of developing a FinTech tool, because it is crucial for entrepreneurship.

Second hint: Involving the community and designing a customized, impactful solution aligns perfectly with the PBL framework.

Third hint: Copying existing apps without adaptation lacks innovation; sometimes we may not recognize or contextualize what copying is but it is the opposite of entrepreneurship.

[End_of_Page]

5.3 Recap and self-assessment Micro-MOOC 4

Act_ID# 5.3.1 Micro-MOOC 4 recap [Hypertext]

[Hypertext]

In the fourth Micro-MOOC we learned about:

- Key Competence Area 1 about Ideas and Opportunities in the EntreComp framework.
- What is an action plan and how short-term and long-term goals can fit in it.
- How can you teach your students about the importance of opportunities in entrepreneurship and social entrepreneurship.

We also saw:

- Examples of social entrepreneurship and how technology and finance education can be combined.
- Through the scenarios we examined ideas and activities for your students to navigate while trying to solve read life problems for their community.

[End_of_Page]

Act_ID# 5.3.2 Open Response Assessment Assignment: Report

[Open Response Assessment]

The rationale

Being considered an exemplary teacher and creating value for your colleagues that teach the same subject is always an incentive to try harder. It is especially useful however, if you are experimenting with ideas and skills relevant for the economy and society and especially in Europe. In the EU, policy makers work together with educators to either conceptualize and draft or improve frameworks about green skills, STEAM education, empowering minority students and relevant for us entrepreneurship.

The task

You have organized a student-led entrepreneurship project, worked on it for the past academic year and you have been just awarded at a national competition. Everyone at your school is excited and this achievement has now the attention of other schools in your city. Meeting with them is not feasible, so you have been requested to write a brief article of 400 words for a local publication.

Useful tips

- The report should be at least 400 words and cover all the criteria.
- You need to demonstrate that you were on top of the situation guiding your students all the way through.

Brief description of the criteria

- I talked about the clarity of goals.
- I explained the structure of the action plan.
- I shared details about the implementation of the project.
- I explained which opportunities in our local community inspired this project.

Table 14: Rubric used in the Open Response Assessment in micro-MOOC 4

Criteria	Needs Improvement (1)	Satisfactory (2)	Proficient (3)	Exemplary (4)
Clarity of Goals	My description of the goals is unclear, they lack SMART criteria, and do not align with the project's vision.	I described the goals with clarity, with some elements of SMART, but their alignment with the project's vision is vague.	The goals I described are mostly clear; I have used the SMART framework and align well with the project's vision.	The goals we chose are clearly defined, have used the SMART framework, and align perfectly with the project's vision.
Action Plan Detail & Feasibility	My description of the action plan is incomplete, lacks structure, and is unrealistic or missing essential details.	My description of the action plan is basic, with general tasks and timelines, but lacks detail and some feasibility.	My description of the action plan is well-organized, with some detail, though a few areas may lack clarity or specificity.	My description of the action plan is detailed, realistic, and well-structured, with specific tasks, timelines, and resources identified.
Identification of Opportunities	The opportunities I mentioned had little to no potential impact or measurement.	The opportunities I mentioned were somewhat relevant, but their connection to the project were weak or unclear.	The opportunities I mentioned were relevant and connected to the project but lacked originality.	The opportunities I mentioned were highly relevant, innovative, and clearly connected to creating value in the project.
Implementation Strategy	My implementation strategy had little to no potential impact or measurement and it is reflected in my article.	The description of my implementation strategy was vague, with limited potential impact and unclear measurement.	I provided a good and relatively detailed information about our implementation strategy.	My description of our implementation strategy was clear and with strong potential impact, while it mentioned several measurement methods.

Criteria prompts:

- What were your goals, why did you pick these goals specifically and which framework helped you define them.

- Define what is a good plan, and what are the elements it incorporates.
- Define what is an opportunity and how you communicate your vision to others.
- Reflect on your strategy and consider what advice should you include.

[End_of_Page]

Act_ID# 5.3.3 Self-evaluation Checklist: I can… [Hypertext, Poll, Word cloud – Quizizz, W3Schools, Get Bootstrap, Imgbb]

[Hypertext]

The purpose of this checklist is for you to determine whether you feel confident dealing with issues discussed in this unit. You might find it useful in detecting whether you need additional study or support; in the next Unit you will have the opportunity to discuss these topics with your peers at the forum area and in the final Unit we will provide an indicative list of resources for you to consider.

[Poll]

1. I can think of interesting project ideas and design a basic action plan so my students can brainstorm and work on it.
   - No, I cannot.
   - Potentially with some assistance.
   - I can confidently do that.

2. I can describe in a few words what social entrepreneurship is and what stakeholders can be involved.
   - No, I cannot.
   - Potentially with some assistance.
   - I can confidently do that.

3. I can explain to my colleagues how to prepare a project using at least three short-term goals and three long-term goals, incorporating the SMART framework as well.
   - No, I cannot.
   - Potentially with some assistance.

– I can confidently do that.

[Word cloud – Quizizz]

What was the most useful thing you learned in this Micro-MOOC? Let us know in the word cloud and come back to see what other course participants mentioned!

[W3Schools]

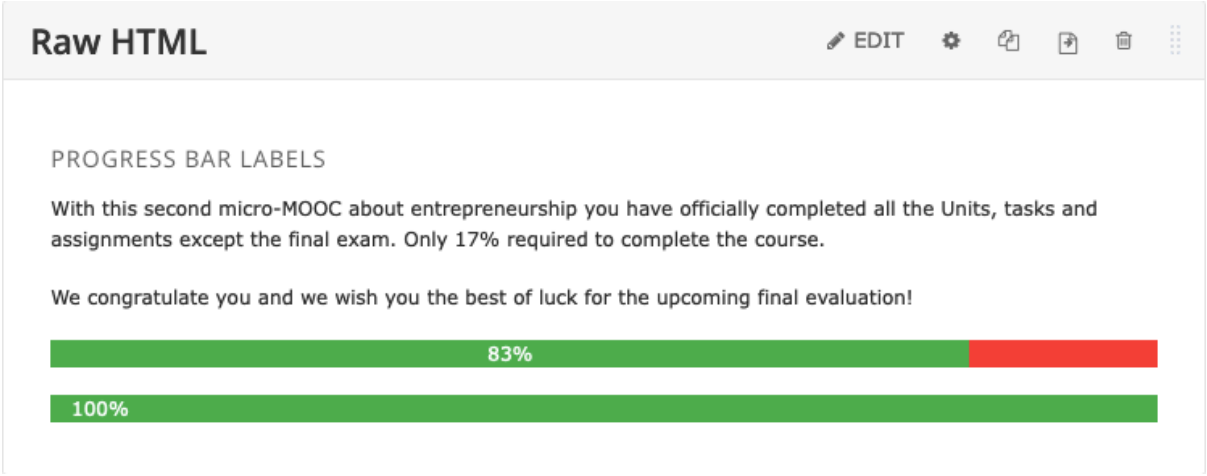


Figure 99: Image depicting the open-source tool W3Schools and the progress bar in Unit 5.3.3[79]

[Get Bootstrap]

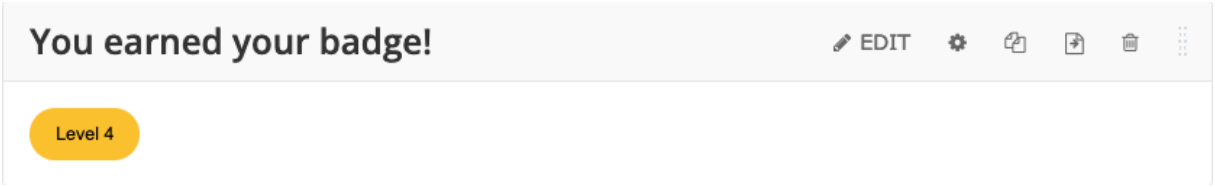


Figure 100: Image depicting the Level badge for Unit 5.3.3[80]

[79] rogress bar with positive reinforcement message to help participants track their progress in the course. Created by the author directly on Edunext with customized HTML code found on the open-source website W3Schools. The respective category is available here: https://www.w3schools.com/w3css/w3css_progressbar.asp

[80] Created by the author directly on Edunext with customized HTML code found on the open-source website Get Bootstrap. The respective category is available here: https://getbootstrap.com/docs/4.0/components/badge/

[Canva and Imgbb]

Figure 101: Image depicting the accomplishment badge created on Canva and generated on Imgbb for Unit 5.3.3[81]

https://www.canva.com/design/DAGRmeEgjqk/F-yWlGH-BhgTrMx6gWpehA/edit?utm_content=DAGRmeEgjqk&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

[End_of_Page]

Act_ID# 5.3.4 [Discussion Forum]

We encourage you to visit the forum area and discuss with your peers about the two following topics. Feel free to respond, quote others and of course start as many new threads as you wish!

1) What tool would you use for your action plan? An editable word template, a spreadsheet, or another application?

2) If you could center your action plan around three skills for your students, which ones would it be and the teachers of which subjects would you design this?

End_of_Page]

5.4 Additional resources and materials

Act_ID# 5.4.1[Recommendations for further learning]

[81] Designed by the author on Canva and embedded on Edunext with an HTML code generated on https://imgbb.com/
Available at: https://www.canva.com/design/DAGRmeEgjqk/F-yWlGH-BhgTrMx6gWpehA/edit?utm_content=DAGRmeEgjqk&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

- Elias, M. (2019, November 14). A Framework for Student Goal-Setting. Edutopia. *https://www.edutopia.org/article/framework-student-goal-setting*. Retrieved August 17, 2024, from https://www.edutopia.org/article/framework-student-goal-setting/
- Haughey, D. (2014, December 13). A Brief History of SMART Goals. Project Smart. Retrieved August 5, 2024, from *https://www.projectsmart.co.uk/smart-goals/brief-history-of-smart-goals.php*
- Abrahams, M. (2023). How to Make a Compelling Pitch. *Harvard Business Review*. Retrieved August 15, 2024, from https://hbr.org/2023/08/how-to-make-a-compelling-pitch
- Cadotte, E. R. (2022). How to Use Simulation Games in the Classroom? *The Journal of Entrepreneurship*, *31*(2_suppl), S90–S134. https://doi.org/10.1177/09713557221107442
- Dal, M., Elo, J., Leffler, E., Svedberg, G., & Westerberg, M. (2016). Research on pedagogical entrepreneurship – a literature review based on studies from Finland, Iceland and Sweden. *Education Inquiry*, *7*(2), 30036. https://doi.org/10.3402/edui.v7.30036

[End_of_Page]
[End_of_Topic]

Day 6 – Final evaluation (1 hour)

6.0 Instructions for taking the micro-MOOC final exam

Act_ID#6.0.1 Information about the final exam

Congratulations for successfully ending the course! We hope that you found the content useful and engaging and that you took the opportunity to experiment with new tools and ideas and consider using new practices.

It is time for you to take your final exam. You will have to answer 40 multiple choice questions with five questions corresponding to each one of the eight learning outcomes of the course. To successfully pass this exam you need to respond accurately to 70% of the questions, or 28 questions. This exam is not timed so you can reflect on what you have learned and take your time to read carefully all the questions. There is only one correct answer for each question.

Good luck!

Figure 102: Mockup example of MOOC certificate[82]

[End_of_Page]

6.1 Final evaluation

Act_ID#6.1.1 Final evaluation [Quiz]

Digital teaching: characteristics and skills

Question 1

Which one of the following is not a characteristic of digital teaching?

A. Offering a variety of digital resources to your students.

B. Accepting handwritten assignments to evaluate.

C. Personalize your lessons as much as possible with the use of technology.

D. Adapt existing teaching printed materials using interactive features or multimedia.

The correct answer is (B).

Explanation: *This isn't practical and is not convenient for maintenance purposes as well. It would be acceptable only during blended learning and not continuously. There are entire*

[82] Source: Canva, modified by the author and available at author's account at: https://www.canva.com/design/DAGMpaqsS4s/ubnCqpYQ6onZpPYj5njS8Q/edit?utm_content=DAGMpaqsS4s&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

platforms and tools to assist students and teachers bring the evaluation process in the online space.

Question 2

How would you define online classroom management?

- **A. Setting up and monitoring a constructive online learning environment in terms of technical infrastructure, behavior and participation.**
- B. Write down an elaborate guide on digital citizenship and netiquette.
- C. The use of a Learning Management System (LMS).
- D. Making sure every students submits their assignments by the end of the semester so you can proceed with their evaluation.

The correct answer is (A).

Explanation: *There is some truth to each statement however the most complete and correct one is (A). To ensure a constructive and sustainable online learning environment bringing your teaching practice to this new level, you need to establish rules, pick the right technology and support, monitor how your students respond to it and ensure a complete learning experience without missing elements (including lesson delivery, assessment and feedback).*

Question 3

Nowadays there is a real abundance of digital tools to use in your practice whether online or in person; presuming that your chosen lesson delivery method is blended learning which combination would you choose?

- A. Use of interactive whiteboard with optional physical presence by students, meeting your students in person for feedback and students taking exams in physical presence.
- B. Use of online labs and tools to deliver your lesson, online assessments for everyone and students working in groups while using online documents and spreadsheets.
- **C. Face-to-face lessons, online assessment and use of online forums to discuss questions and doubts.**

D. You record yourself to deliver your lessons and send the link to your students to watch at their own pace, exams are held in physical presence, and you make use of printed materials.

The correct answer is C.

Explanation: *The use of face-to-face lectures, online assessment and discussions is what describes blended learning best in this case. Lessons need to deliver in real time and there needs to be a balance that favors attendance in person but practice, assessment and discussions in a virtual space.*

Question 4

Which instructional strategy is most effective when a teacher wants to introduce students to digital tools and applications?

A. Flipped classroom where students explore the tools at home first and then discuss and apply them in class.

B. Direct instruction where the teacher only demonstrates the applications without student interaction.

C. Assigning students to read about the applications without using them.

D. Giving students a list of digital tools without providing context or explanation.

The correct answer is A.

Explanation*: The flipped classroom model will allow students to explore the digital tools at their own pace at home and take the time to think about their questions which they will address in class later on for peer discussion and feedback.*

Question 5

Which pedagogical method can best help students develop skills?

A. Traditional lectures in class focusing on digital tools without practical experience.

B. Independent study without any teacher guidance or feedback.

C. Teacher-centered approach where students only watch demonstrations without interaction.

D. Guided discovery, where the teacher provides a framework and lets students explore different tools.

The correct answer is D.

Explanation: *Guided discovery will support students as much as necessary but allow them to decide and experiment with many tools; this is useful in the context of digital skills acquisition and entrepreneurship equally.*

EdTech: the interactive whiteboard in your class boosting innovation, creativity and collaboration

Question 6

Which of the following statements does not describe a benefit of using interactive whiteboards (IWBs)?

A. Increased student engagement.

B. Diminished reliance on traditional teaching methods.

C. Reduced teacher preparation time.

D. Enhanced collaboration among students.

The correct answer is B.

Explanation: *The use of IWBs can indeed reduce some aspects of teacher preparation but they cannot/are not meant to undermine the teacher's role or traditional teaching methods.*

Question 7

How can IWBs support differentiated instruction?

A. They don't, their use guarantees a uniform learning experience for all.

B. Their use favors visual learners and they tend to be the majority in a classroom.

C. Their use is so innovative that eliminates the need for individual support.

D. Seemingly easy their use is actually quite sophisticated and presents multiple formats and activities to cater to different learning styles.

The correct answer is D.

Explanation: *IWBs can accommodate diverse learning styles through the use of presentation formats, and possibilities to design and implement various activities.*

Question 8

Which one of the below is not considered a characteristic of effective digital pedagogy with IWBs?

- **A. Teacher-centered instruction.**
- B. Student-centered learning.
- C. Active student engagement.
- D. Integration of technology into the curriculum.

The correct answer is A.

Explanation: *Digital pedagogy with the use of EdTech products and in our case IWBs is based on student-centered learning where students have the opportunity to contribute and participate actively.*

Question 9

How can interactive whiteboards be used to foster critical thinking?

- A. By encouraging passive learning.
- B. They cannot be used for this purpose.
- C. By promoting memorization.
- **D. By presenting complex problems encouraging students to explore possible solutions.**

The correct answer is D.

Explanation: *IWBs have the advantage of presenting information to students using multimedia and many resources; this is in line with student-centered learning principles that demand students explore to find new solutions.*

Question 10

Which of the following is an example of how IWBs can support collaborative learning?

A. Students working on their own on individual assignments and presenting their findings only when they are done.
B. A teacher delivering a lecture to a large class online using monologue.
C. Students working together on a shared document or project using the IWB.
D. Limiting student interaction to minimize distractions.

The correct answer is C.

Explanation: *While students can work together on collaborative documents from their computers as well, here the correct answer is C because it examines yet another aspect; students becoming competent in the use of EdTech products and new technologies in addition to the learning content they are exposed to.*

Formative and summative assessment with the use of technology

Question 11

What is the main purpose of formative assessment in education?

A. To assign final grades at the end of a term.
B. To measure long-term retention of content.
C. To provide continuous feedback helping this way both learners and teachers by improving the instructional process.
D. To evaluate student readiness for standardized testing.

The correct answer is C.

Explanation: *The primary reason to use formative assessment is to monitor student learning and provide ongoing, continuous feedback.*

Question 12

Which of the following is an example of a summative assessment?

A. Weekly quizzes that inform day-to-day instruction.
B. A final project or exam at the end of the semester.

C. Class discussions that explore new themes and topics.

D. Peer reviews of draft essays for constructive feedback.

The correct answer is B.

Explanation: *Summative assessments are taken at the end of a learning unit, course or lesson.*

Question 13

What is one advantage of using digital tools for formative assessment in a classroom setting?

A. Digital tools eliminate the need for teacher involvement, making the process entirely automatic.

B. Digital tools provide real-time feedback, allowing teachers to quickly adjust instruction based on student performance.

C. Digital tools make it difficult for students to understand the material.

D. Digital tools are primarily used for summative assessments, and not formative.

The correct answer in B.

Explanation: *Digital tools provide instant feedback which saves time and allows to teachers adjust their instruction methods.*

Question 14

Which instructional strategy is most effective for using digital tools to conduct formative assessments?

A. Blended learning, where teachers use online quizzes and polls during lessons to provoke students' understanding and give instant feedback.

B. Using traditional paper-based assessments at the end of each unit.

C. Allowing students to self-assess without any digital tools or teacher movement.

D. Assign grades based on formative assessment only repeatedly.

The correct answer is A.

Explanation: *Blended learning combines digital and in-person instruction so it is very accommodating for formative assessments. Online quizzes and polls allow teachers to check student understanding in real-time.*

Question 15

Which pedagogical method is most suitable for applying summative assessments using digital tools?

A. Providing one-time feedback on projects without the use of digital tools.

B. Conducting oral exams without the use of any digital tool.

C. Differentiated instruction, where teachers use many platforms online (e-porfolios) to assess the work done by their students.

D. Uniform testing where all students take the same paper-based exam.

The correct answer is C.

Explanation: *Differentiated instruction leverages digital tools to the maximum and accommodates diverse learners. It also allows personalized assessment that better reflects the needs of each student.*

Multimodality in feedback

Question 16

What does multimodal feedback concern primarily?

A. Giving feedback containing factual information and statistics.

B. The use of different formats such as text, audio, video to engage your students in their feedback.

C. Offering feedback through video call instead of a face-to-face meeting.

D. Sending feedback in the form of email including several attachments and examples of better assignments.

The correct answer is B.

Explanation: *While you can give feedback to your students during video calls, it is not considered multimodality; it is instead the use of various formats that engage them visually or auditory.*

Question 17

Which of the following is an example of multimodal feedback?

A. A performance report with multiple handwritten comments.

B. A video recording where the instructor outlines the strengths and areas for improvement.

C. A report with a mix of annotated visuals and links to instructional videos.

D. A checklist made on Google Forms listing what worked and what didn't.

The correct answer is C

Explanation: *While you don't have to include every format in your feedback to be considered multimodality, you still need to provide different ways to convey information.*

Question 18

Why is multimodality beneficial for students?

A. It provides information in a visually pleasing way.

B. It familiarizes them with digital tools engaging them.

C. It limits the amount of criticism they receive.

D. It contains little information which forces them to consult more sources and therefore learn.

The correct answer is B

Explanation: *There is some truth to every option but indeed the main benefit is that students are more engaged when a usually stressful procedure is using digital tools giving them additional skills.*

Question 19

Which instructional strategy is most effective for providing multimodal feedback using digital tools?

A. Flipped classroom, where students receive video and audio feedback at home and then discuss it in class.

B. There is no such thing, text-based feedback works best.

C. Traditional teacher-centered lectured with no feedback, they work for their own understanding.

D. Providing feedback solely through grades without comments or explanations.

The correct answer is A.

Explanation: *In flipped classroom multimodal feedback such as video and audio allow students to review the comments at their own pace and prepare for the discussion in class.*

Question 20

How does multimodal feedback help students with diverse learning needs?

A. It ensures that everyone will receive the same comments, so it is an inclusive process.

B. It uses multiple formats which cater to various learning needs.

C. It limits the amount of information, so they are not overwhelmed.

D. It doesn't, as it heavily relies on the use of video leaving out students with auditory issues.

The correct answer is B.

Explanation: *This approach accommodates indeed learners with various learning types (visual, auditory, readers) but also learners with learning preferences or needs.*

Planning and mobilization of resources

Question 21

Which of the following is an example of utilizing material resources for a school-based entrepreneurship project?

A. Making the most out of the school's LMS platform.

B. Using the school's 3D printer to create prototypes.

C. Organizing a brainstorming session among classmates.

D. Seeking mentorship from a local entrepreneur.

The correct answer is B.

Explanation: *Material resources are tangible items we can touch and use; they might include tools or spaces and equipment, but not a software like LMS although technically it is accessed through the school's computers.*

Question 22

Which of the following is an example of utilizing non-material resources for a school-based entrepreneurship project?

A. Attending a workshop at the school's library.

B. Using the school's computer lab.

C. Using the available budget to order materials needed for the project.

D. Using the available budget to rent a booth at a local market.

The correct answer is B.

Explanation: *Non-material resources are intangible and mainly refer to skills, knowledge and qualifications. In our example the resource is the workshop attendance (capacity building) and the use of library resources is not to be confused as intangible.*

Question 23

How can a school's facilities be used the best way possible for student entrepreneurship projects?

A. Inviting other schools in an online meeting using a video conferencing tool.

B. Use the school's social media accounts to promote the project.

C. Using the books at the library to research about the project.

D. Discuss the project and brainstorm during a dedicated session where the entire school is present.

The correct answer is C.

Explanation: *As simple and common as it may sound, the use of the library summarizes best the optimal use of school resources. It provides access to organized information and can easily acquire new resources if needed.*

Question 24

Which pedagogical method is most effective when guiding students on how to leverage non-material resources like software in their entrepreneurship projects?

A. Inquiry-based learning, where students explore different software tools and network-building strategies through guided discovery.

B. Teacher-centered instruction on non-material resources.

C. Memorization of software capabilities and features without any practical application.

D. Independent research without any guidance or structure.

The correct answer is A.

Explanation: *Inquiry-based learning encourages students to experiment and investigate with tools, in our example software. This experimentation will be far more fruitful and useful as they will have the opportunity for trial and error, which enables a deeper understanding compared to a more instruction-led, theoretical approach.*

Question 25

Which instructional strategy helps students more in utilizing resources?

A. Project-based learning, where students actively use hardware and workspaces to build their idea.

B. Studying case studies about their use without practicing.

C. Assigning a textbook chapter on resource management without practicing.

D. Memorizing a video presentation about the use of the said resources.

The correct answer is A.

Explanation: *PBL ensures hands-on research, building and experience; it teaches students how to use the software or any other type of resource and learning by doing ensures their deep understanding; assigning textbook chapters is the worst option, you can consider asking them to write instruction for others.*

Planning of teams

Question 26

When seeking to involve mentors in a school-based entrepreneurship endeavor, which of the below strategies is the best one?

A. Find someone resourceful and ask for financial support.

B. Inform them early on what the project is about and when you think you will be needing their support.

C. Regularly updated them on the project's progress and seek their advice each time you need to.

D. Be mindful and contact them only when you need support.

The correct answer is C.

Explanation: *Even if their mentorship is pro bono meaning they get no money from your team, their involvement is still a form of commitment and they need to be involved frequently.*

Question 27

Which one of the below is the most effective way to mobilize local community members with expertise and resources to assist your student with their entrepreneurship projects?

A. Approach them with a clear action plan and be transparent as to how their involvement will benefit both of them.

B. Ask their help before setting an action plan to involve them as early as possible hopping they will commit.
C. Offer them leadership positions in case the idea moves forward and becomes a success.
D. Involve them only if the project moves on and becomes a success.

The correct answer is A.

Explanation: *The objective of mobilizing others is one of the main competencies of EntreComp and strongly correlates with communication, forming a network and exercising skills like pitching. You need to be convincing, respectful of their time and focus on how this project will benefit the community and the students but avoid bringing in the finances.*

Question 28

When pitching your school entrepreneurship project to gain the attention of various stakeholders, which of the below strategies will likely succeed over the others?
A. Give a detailed presentation and send them a Power Point with additional information afterwards.
B. Use some buzz words and expressions, maintain the mystery and don't go into details.
C. Discuss only the financial aspect of the project.
D. Center your presentation around the challenges, opportunities and metrics.

The correct answer is D.

Explanation: *Pitching is a much-needed skill your students will have to gain for reasons that extend beyond their school projects; it is meant for important information as people who tend to be in the audience are exposed to many sessions even daily and a presentation needs to really stand out.*

Question 29

Which of the following methods is the most effective for teaching entrepreneurship in schools?
A. Traditional lectures with no student interaction.

B. Project-based learning where students create and develop their business ideas.

C. Memorization of business concepts and definitions.

D. Solely using textbooks without real-world application.

The correct answer is B.

Explanation: *Project-based learning (PBL) allows students to actively engage in the entrepreneurial process fostering creativity, critical thinking and practical skills.*

Question 30

In teaching entrepreneurship how can the inquiry-based learning method be most effectively applied?

A. By providing all the answers upfront.

B. By giving them a lot of information about the theoretical aspects of a project without practical application.

C. By limiting students to follow their teacher's instruction only.

D. By encouraging students to ask questions and explore real-world problems that interest them.

The correct answer is D.

Explanation: *Inquiry-based learning is a trigger for students to exercise their curiosity and innovation; it allows them to investigate problems and seek solutions.*

Action plan design for the management of short-term and long-term goals

Question 31

What is the main purpose of setting short-term goals in a school entrepreneurship project?

A. To complete the entire project quickly.

B. To track progress and achieve small milestones that lead to success.

C. To avoid planning for the future.

D. To focus solely on immediate tasks without considering the bigger picture.

The correct answer is B.

Explanation: *Short-term goals help break down a larger project into manageable tasks, allowing for steady progress and making it easier to achieve long-term objectives.*

Question 32

When preparing an action plan for a school entrepreneurship project, what is the most important factor to consider?

A. Only the final goal, ignoring the steps needed to get there.
B. Doing as much as possible because time management is an unpredictable factor in entrepreneurship.
C. Focusing on one goal at a time without considering other aspects.
D. Both short-term and long-term strategies are important as they ensure a homogenous, organized path to success.

The correct answer is D.

Explanation: *A well-rounded action plan incorporates both short-term and long-term strategies ensuring each step is aligned with the overall vision.*

Question 33

Why is it important to set long-term goals in a school entrepreneurship project?
A. To make sure the project never changes direction.
B. To provide a clear vision for the future and guide decision-making throughout the project.
C. To limit the scope of the project to what can be achieved immediately.
D. To avoid making detailed plans for the future.

The correct answer is B.

Explanation: *Long-term goals offer direction and purpose, helping to steer the project, keeping team members aligned and grounded with a common, broader vision.*

Question 34

Which instructional strategy adopted by teachers is the most effective for helping students set both short-term and long-term goals in their school entrepreneurship projects?

A. Goal-setting workshops, where students collaborate and brainstorm together to define achievable goals with guidance from the teacher.

B. Assigning students to create goals on their own to see where they stand in terms of creativity.

C. Lecturing about goal setting without practical application.

D. Focusing only on short-term goals and ignoring long-term goals.

The correct answer is A.

Explanation: *A workshop like that will allow students to comprehend deeply the approach to goal setting and give them better ideas overall as to how their project needs to be planned before the proceed and engage in trial and error.*

Question 35

Which pedagogical method is best suited for teaching students how to create an action plan incorporating short-term and long-term objectives?

A. Giving students a pre-made action plan template and allowing them to work collaboratively.

B. Allowing students to create an action plan from scratch during flipped classroom and discuss it later on in class.

C. An inquiry-based session where teachers ask them questions based on action plan templates they found online.

D. Scaffolding where the teacher gradually builds up the complexity of the action plan and giving tasks for short-term and long-term goals instantly to each one.

The correct answer is D.

Explanation: *Scaffolding provides the necessary support as students develop their action plans, ensuring they understand how to balance short-term and long-term action plans and makes them eager to assume responsibility instantly of their preferred tasks.*

Identifying opportunities and creating value for the society and economy

Question 36

What is the primary benefit of identifying social needs when developing a school entrepreneurship project?

A. To ensure the project is financially profitable.

B. To create a project that addressed real problems and has a positive impact on the community.

C. To create a project that stands out compared to the competition.

D. To focus only on what students find interesting.

The correct answer is B.

Explanation: *Social entrepreneurship has as a first objective to address societal issues and has nothing to do with competition, financial gain or even students' preference.*

Question 37

Which approach is most effective for spotting opportunities in social entrepreneurship projects within a school setting?

A. Conducting surveys or interviews with community members to understand their challenges and needs.

B. Relying solely on online research without community engagement.

C. Focusing only on what has been done in previous projects.

D. Using random ideas without any basis in community needs.

The correct answer is A.

Explanation: *Even when dealing with the issues of a community or even your school that you are familiar with, it is still important to implement professional processes such as questionnaires, surveys, interviews and then analyze the data accordingly.*

Question 38

Which of the following ideas represents a sports entrepreneurship opportunity that benefits the community?

A. Developing a fitness app for teachers and students.

B. Starting a coding club that teaches students how to build websites.

C. Organizing a charity sports event to fund new athletic facilities for the school.

D. Launching a social media campaign on the school's Facebook page inviting people to participate in a marathon.

The correct answer is C.

Explanation: *The main characteristic of entrepreneurship is that it creates a business or project and actively involves people but not for leisure but to work towards a solution.*

Question 39

Which pedagogical method is most effective in helping students identify opportunities for social entrepreneurship within their school or community?

A. Memorizing definitions of social entrepreneurship without real-world examples.

B. Teacher-led lectures that focus on theory without any practical application.

C. Independent research without any teacher guidance.

D. Experiential learning where students engage directly with community members to discover unmet needs and potential projects.

The correct answer is D.

Explanation: *Experiential learning immerses students in real-world scenarios allowing to interact and learn from their communities as usual.*

Question 40

Which instructional strategy is best suited for guiding students develop social entrepreneurship projects that benefit their community?

A. Problem-based learning, where students work on solving real social issues through entrepreneurship, with guidance from the teacher.

B. Rote learning of business terms without applying them.

C. Watching videos on social entrepreneurship without any follow-up activities.

D. Solely focusing on profit-driven business models without considering social impact.

The correct answer is A.

Explanation: *Problem-based learning engages students in the process of tackling social challenges, real problems the society is facing while trying to apply to the best of their knowledge entrepreneurial principles.*

[End_of_Page]

6.2 Receiving your certificate, take away messages and what comes next

Act_ID#6.2.1 Instructions on how to receive the certificate of the micro-MOOC [Hypertext]

After completing all the micro-MOOCs of this course, you can generate and receive automatically your certificate by following the steps below:

1. Profile navigation: Once you have logged in with your account details, go to your profile or the main page of the course.

2. Completion check: Make sure that all the micro-MOOCs and each Unit of the course have been completed and that you have achieved the required grade (if applicable).

3. Certificate Issuance: In the certificates section, you will find the "Certificate Issuance" option. Click on this option.

4. Information Verification: Confirm that your personal information is correct as it will appear on the certificate. Make the necessary corrections if necessary.

5. Get Certificate: After the issue step, a "Get Certificate" option will appear. Click this option to download your certificate in PDF format.

6. Save and Print: Save the certificate on your computer and, if you want, print it to have it in paper form.

Congratulations!

[End_of_Page]

6.3 Micro-MOOC wrap-up and next steps

Act_ID#6.3.1 Take away messages and what's next [Hypertext]

Our rationale behind certain activities for you to consider

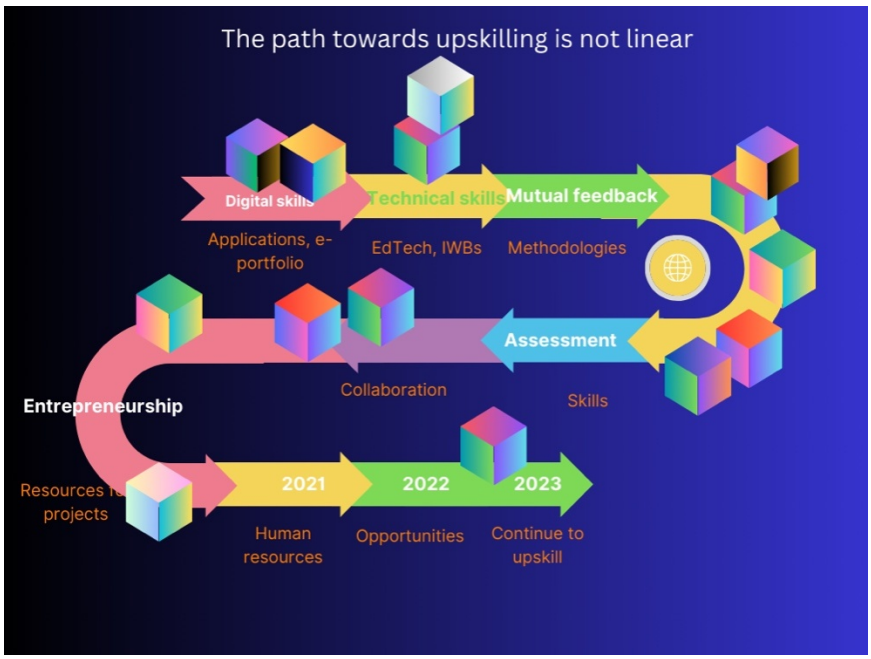


Figure 103: Image depicting the path towards upskilling[83]

We hope that you have enjoyed this course! Digital skills and entrepreneurship mutually complement each other. Without technology you cannot innovate, and innovation comes only if you have the resources initially but, in the end, you are able to improve them and bring capacity building programs to life to inform others. This is the reason this MOOC focused on these two skillsets and consequently the excellent Frameworks that prompted its design. Developments in education are moving fast, and we think that these two different skillsets need to be pursued simultaneously.

You may have noticed that we requested you to work on multiple templates and we introduced you to as many possible digital tools during this process; while we introduced you to the idea of an e-portfolio officially, we also wanted you to have a small portfolio of your own following the completion of this course. The reality is that even resume templates will be gradually replaced by portfolio-based hiring processes, while long lists of certifications and qualifications will be replaced with micro-credential programs relevant to the competencies and skills of a professional. We want you to be well-equipped and assist your students do the same. You creating proactively and adapting the templates you

[83] Source: Created by the author on Canva and available at: https://www.canva.com/design/DAGN7AO0NBc/6mJ_68hxV4dzXpUIrKz0gQ/view?utm_content=DAGN7AO0NBc&utm_campaign=share_your_design&utm_medium=link&utm_source=shareyourdesignpanel

were given, was a major learning objective we didn't explicitly mention at the beginning of the course.

But the purpose of courses like this is to keep the content relatively brief, give you the necessary information through the presentations and demonstrations and let you interact with others and create. Some tasks may have been more demanding than others but the road to your school's development is certainly not linear; just like the graph above presents some steps will require heavier effort, some others will take longer due to the competencies they require.

What's next

Do not miss out and join our next micro-MOOC course series based on DigCompEdu and EntreComp for competence levels B2 and Level 4 respectively. In this new series we will take a step further exploring AI in education and how to set up the development of an entrepreneurship acceleration program. As an alumni, you will receive automatically an email one month before the course starts, nothing more to do from your side. We hope to see you there!

[End_of_micro-MOOC]

Annex 3: Evaluation criteria table used for the purposes of Chapter 5

<table>
<tr><th colspan="4">EVALUATION CRITERIA[84]</th></tr>
<tr><td colspan="4">Part A: Design</td></tr>
<tr><td colspan="4">1. Learning outcomes (covering sufficiently all the chosen competencies and proficiency levels)</td></tr>
<tr><td colspan="4">2. Constructive Alignment application (Learning Outcomes - Assessment Tools)</td></tr>
<tr><td colspan="4">3. Appropriateness of the choice of digital media/tools for the educational activities</td></tr>
<tr><td>3a Presentation</td><td>3b Demonstration</td><td>3c Practice</td><td>3d Evaluation</td></tr>
<tr><td colspan="4">4. Duration and workload (the learning activities meeting the planned time; constraints - sufficient, incomplete or excessive)</td></tr>
<tr><td colspan="4">5. Clarity of graphical representation and compatibility with the model demonstrated</td></tr>
<tr><td colspan="4">B: Implementation</td></tr>
<tr><td colspan="4">B1. Effective use of Open edX features to deliver a good learning experience</td></tr>
<tr><td colspan="4">1. Completeness of integration: The implementation of the course in the Open edX environment is consistent with the course content as documented in the corresponding document.</td></tr>
<tr><td colspan="4">2. Overall aesthetic effect and learning experience (ease of navigation, aesthetic uniformity).</td></tr>
<tr><td colspan="4">3. Utilization of a variety of digital media/ educational technology tools with emphasis on suitability and usability for a) presentation, b) demonstration, c) practice, d) self-assessment activities.</td></tr>
<tr><td colspan="4">4. Self-assessment questions provide feedback to the learner.</td></tr>
<tr><td colspan="4">5. Existence of interaction activities between learners e.g. through discussion forums.</td></tr>
<tr><td colspan="4">B2. Content of the micro-MOOC</td></tr>
<tr><td colspan="4">6. Evaluation of the general overview of the micro-MOOC (in terms of completeness and presentation of the required information)</td></tr>
<tr><td colspan="4">7. The course content is valid and up-to-date and clearly articulated.</td></tr>
<tr><td colspan="4">8. The rules of academic ethics and conduct have been observed with emphasis on copyright management.</td></tr>
</table>

[84]The present table was initially provided in the context of the course 721 – Educational Technology by staff member Sofia Mougiakou during her demonstration sessions. It has been adapted (translation from Greek to English) for the purposes of this Chapter and it is shared under a Creative Commons license. We are grateful for this guide and her permission to use and include it.

EVALUATION CRITERIA[84]
9. **Learning activities are aimed at achieving the learning outcomes.**
10. **Interactive learning activities that encourage active participation are included**
11. **The reference list is up to date and the additional resources are directly linked to the course** (clarity, quality). Open content has been used with appropriate reference to the author and all hyperlinks are active.
12. **Coherence of the micro-MOOC.** The different authors of the micro-MOOC modules have worked together to ensure that the modules, which have been designed, are coherent in terms of structure and methods of teaching and assessment to maintain coherence and unity of the educational content, avoiding unnecessary repetition.
B3. The trainee shall have at his/her disposal:
13. **Information on the time availability of the course** (course calendar, scheduled access to course modules and important dates, including exams), expected time commitment, learning outcomes, prerequisites.
14. **Grading criteria and certificate requirements** are posted on the course.
15. **Instructions for practice and (self) assessment activities have been provided** including suggestions regarding the use of forums, forum etiquette.